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PHYTOLOGIA

An international journal to expedite plant systematic, phytogeographical and ecological publication

Vol. 85

November 1998

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ATLAS OF THE TEXAS SPECIES OF PHLOX (POLEMONIACEAE)

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ABSTRACT

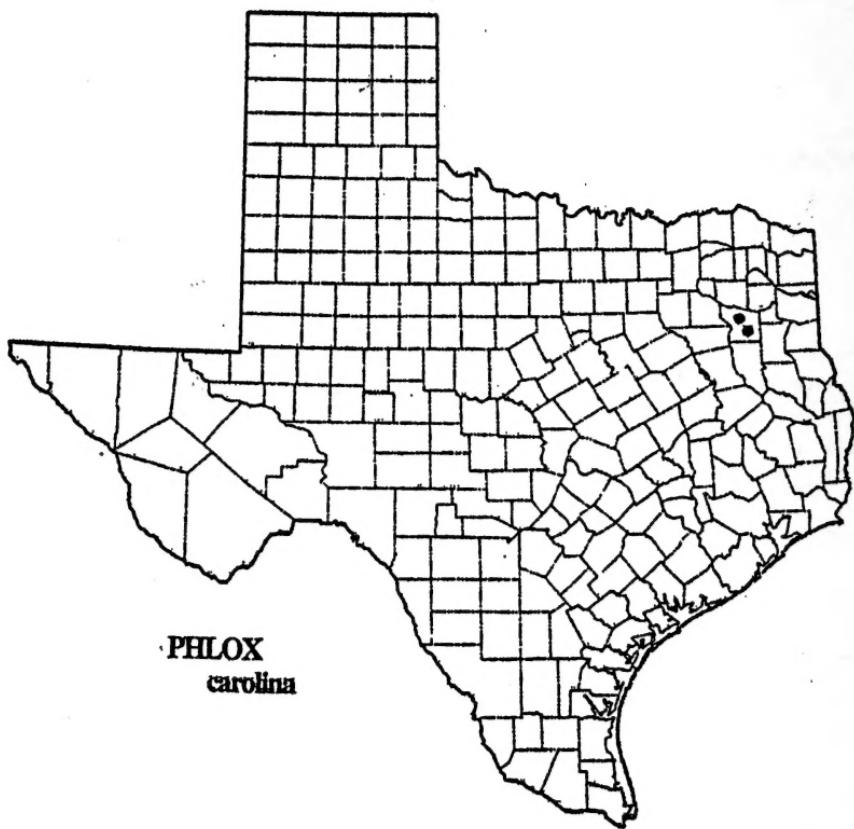
In a forthcoming ATLAS OF THE VASCULAR PLANTS OF TEXAS (Turner *et al.* 2002), *Phlox* is treated as having eleven species. Maps showing their distribution in the state are provided, along with comments relating to their taxonomic status, including infraspecific categories. In addition, the nomenclature of each is briefly discussed, along with pertinent synonymy.

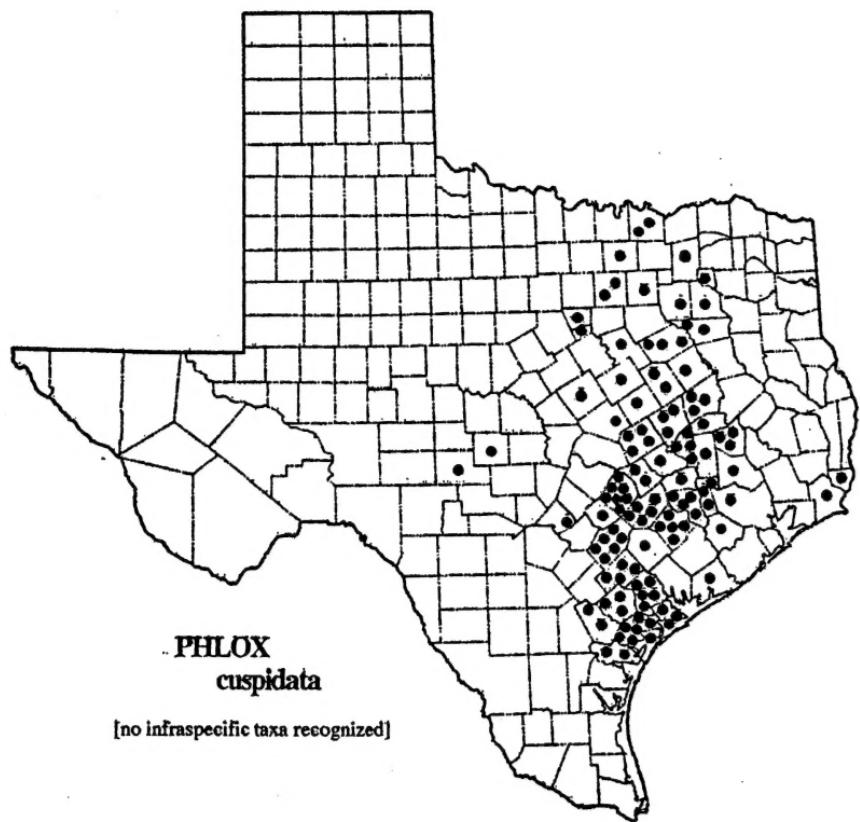
KEY WORDS: *Phlox*, Polemoniaceae, Texas

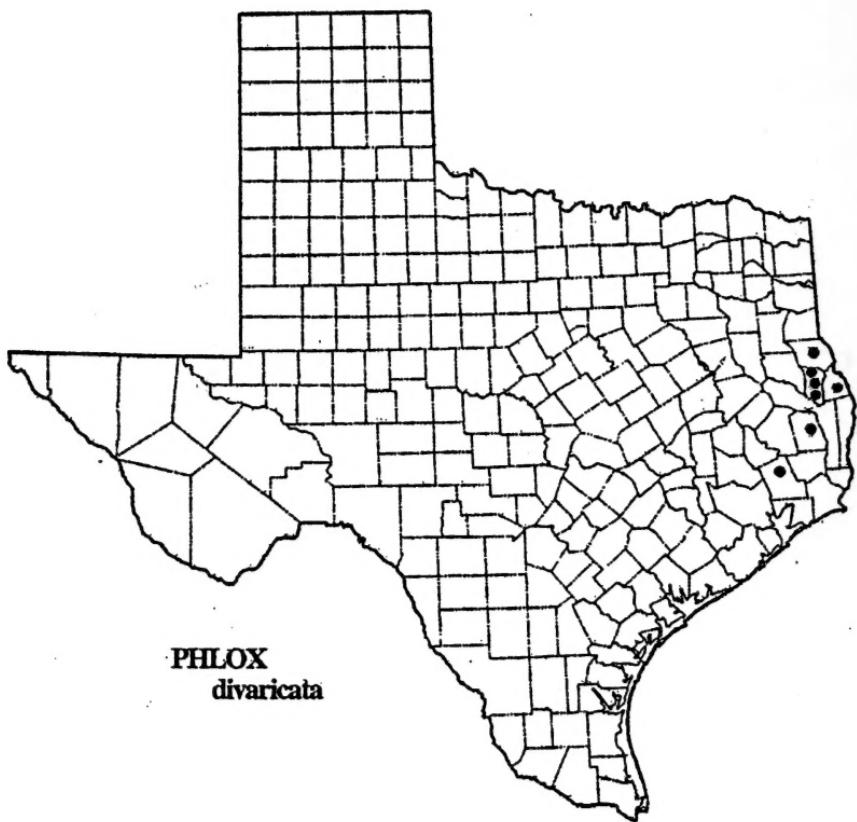
The last revisionary treatment of *Phlox* for Texas was provided by Wherry (1967). Correll & Johnston (1970) adopted the latter's study (essentially intact) in their treatment of the genus for Texas.

My interest in the genus is of long standing, beginning with the work of Erbe & Turner (1962) on the annual species of *Phlox*, continuing through Turner (1998), and culminating with my taxonomic appraisal of the genus for the state in my *Atlas of the Vascular Flora of Texas* (Turner *et al.*, in prep.). The latter treatment accounts for the dot-maps provided in the present, most of which are based upon herbarium records on file at various institutions in the state of Texas, although some of these are based upon published county records from this or that earlier publication (e.g. Wherry 1967; Erbe & Turner 1967, etc.).

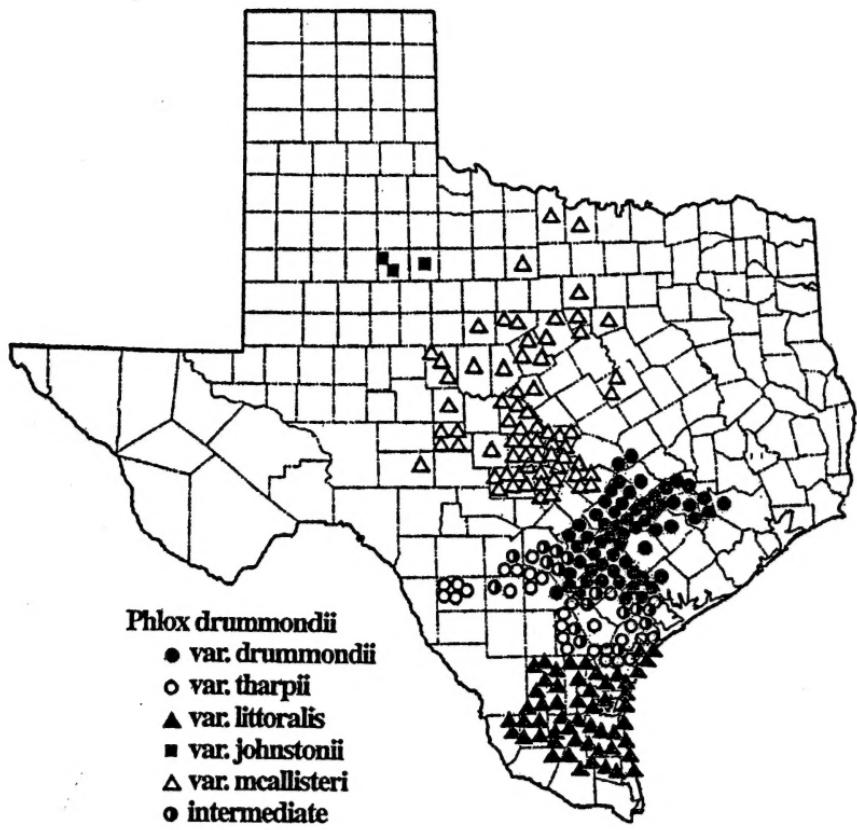
Stimulation for the present contribution was also occasioned by the DNA studies of *Phlox* by Ferguson (1998) and Ferguson *et al.* (1999) on the relationships of the eastern North American taxa. The essence of their studies were presented in phylogenetic form, their figures noteworthy for their clustering patterns of the

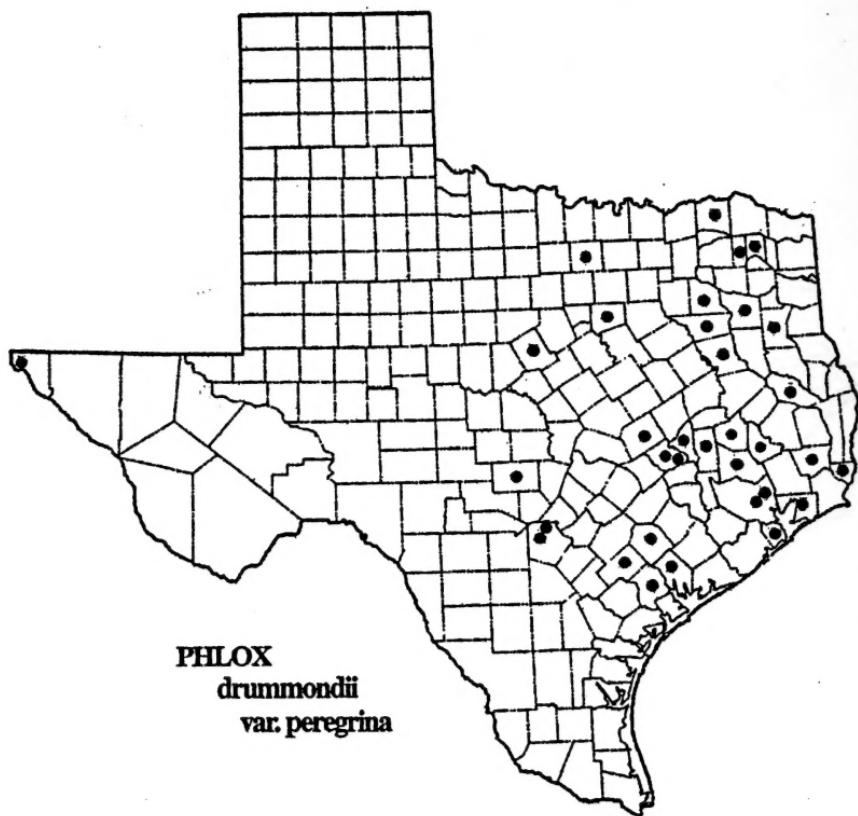


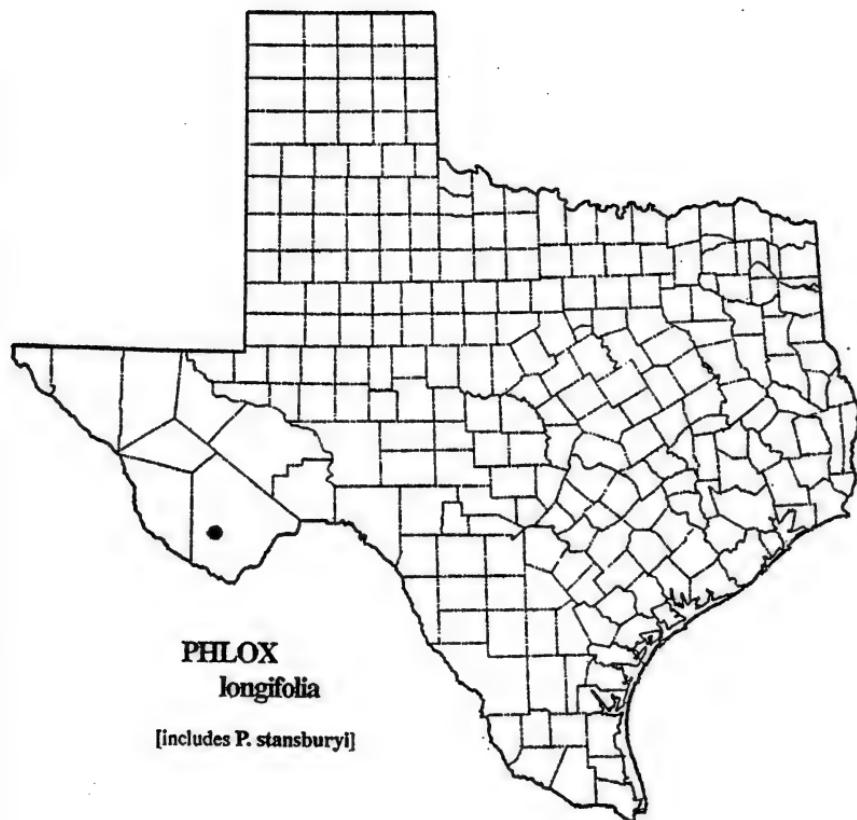


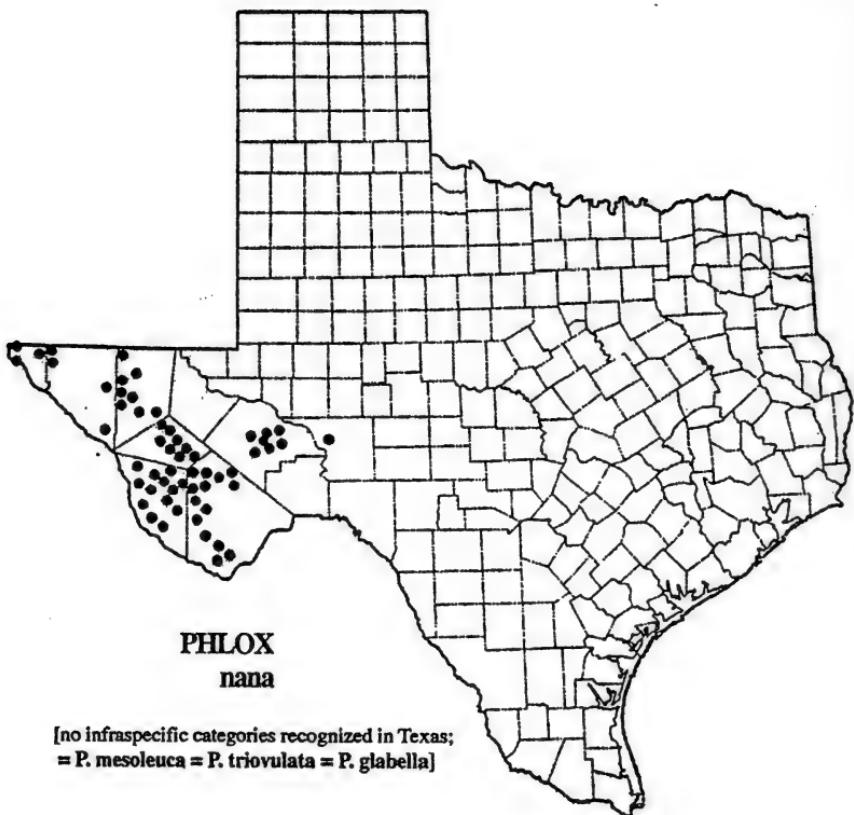


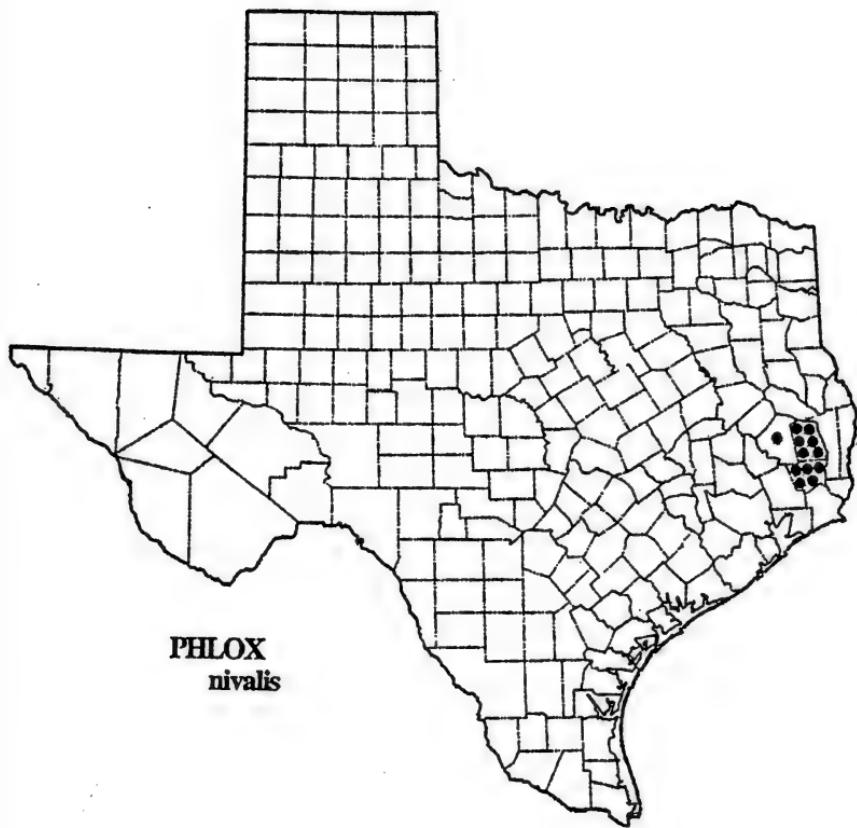
PHLOX
divaricata

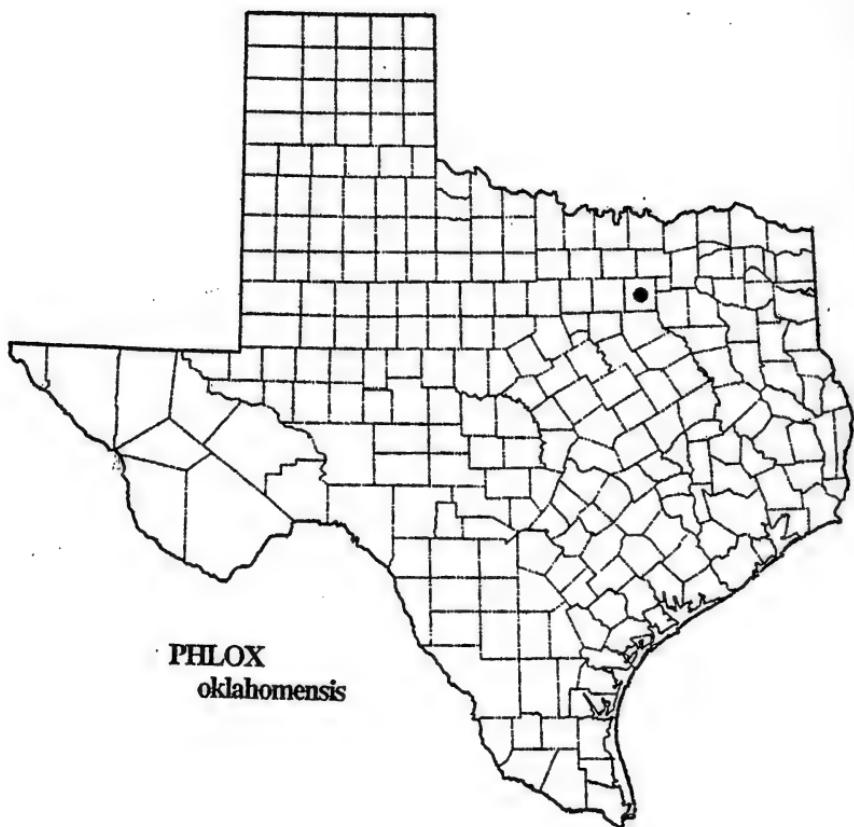


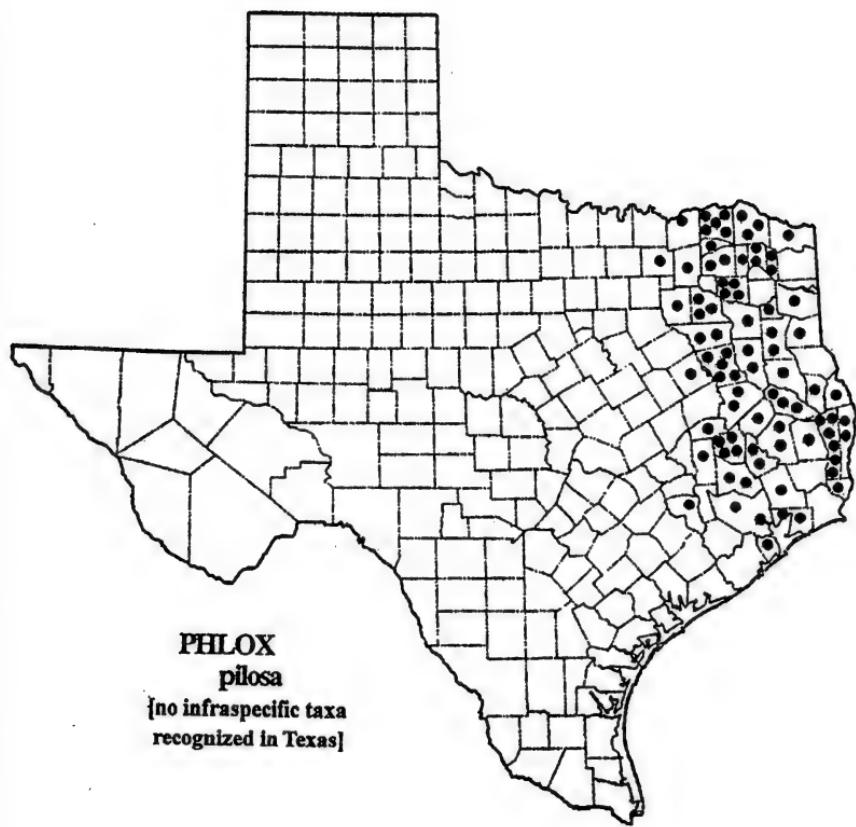


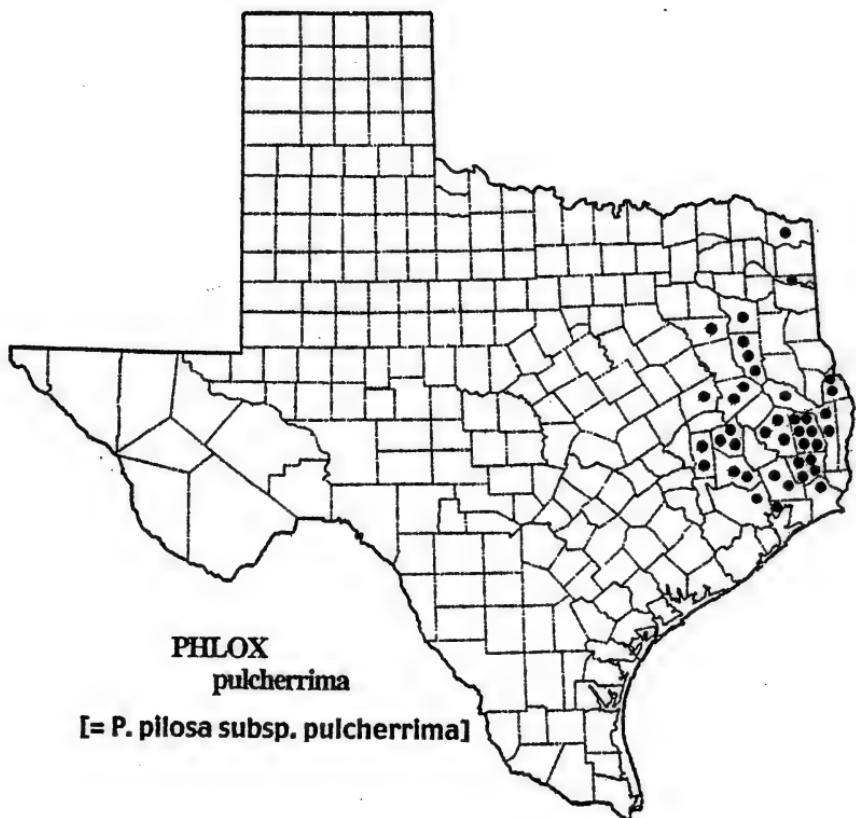


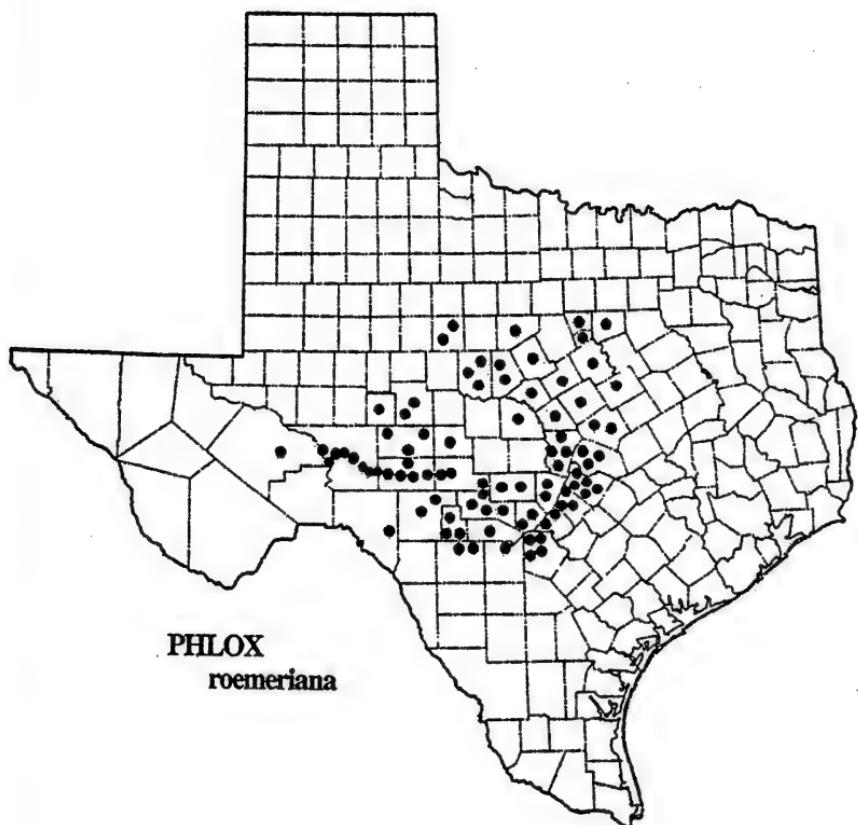


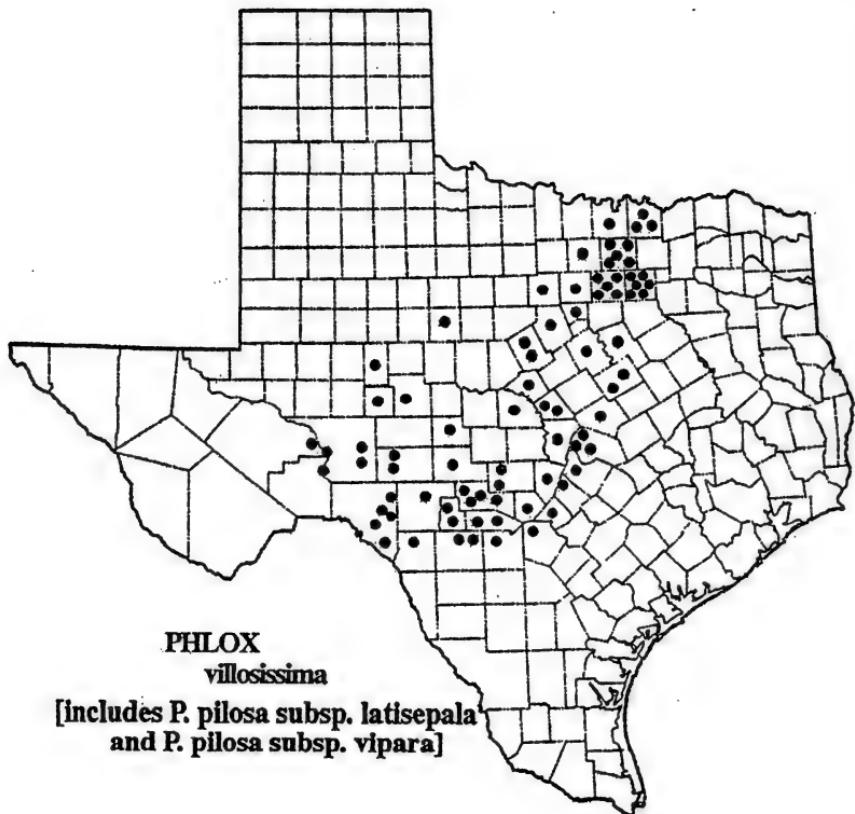












various infraspecific taxa of *Phlox pilosa* L. In particular, I was struck with figures 2 and 3 in Ferguson *et al.* (1999) in which *P. pilosa* subsp. *latisepala* Wherry and subsp. *riparia* Wherry (both largely confined to Texas) formed a compact cluster with the closely related and recently described cohort, *P. pattersonii* Prather. Prior to their work (of which I was ignorant) I had provided an assessment of the Texas taxa of *Phlox*, this including maps showing their distribution in the state. Checking my work against their cladograms, I was pleased to discern that *P. pilosa* subsp. *latisepala* and *P. p.* subsp. *riparia* were treated by me as consisting of a single distinct species, *P. villosissima* (A. Gray) Whitehouse, without recognizable infraspecific taxa, as shown in Figure 12 of the present account.

So as to stimulate the field observations of others on this interesting genus in Texas, I provide here maps, arranged alphabetically, for all of the taxa of *Phlox* which I recognize for the state, along with pertinent nomenclatural and taxonomic observations of my own. It should be noted that I advocate at the specific level an ICBN-based trinomial system of nomenclature in which the subspecies is treated as a category to be used for clustering or divergence purposes, much as the subgenus is used for clustering and/or divergence purposes within the genus, this discussed in more detail by Turner & Nesom (2000).

Phlox carolina L.

I have not examined Texas material of this taxon but Wherry (1967) reports two Reverchon specimens from Smith County. *Phlox carolina* is a well-marked species of the southeastern United States; Texas material belongs to the subsp. *angusta* Wherry.

Phlox cuspidata Scheele

The biology and nomenclature of this taxon is adequately covered by a number of workers, this summarized by Ferguson *et al.* (1999). Wherry (1967) recognized three varieties of this taxon, all of which appear to be but forms of a single variable species, the variability compounded by the occasional hybrid and/or backcrosses with *Phlox drummondii* Hook.

Phlox divaricata L.

This is a relatively rare taxon in Texas, occurring in the easternmost portion of the state, extending into this region from a much wider distribution in the eastern United States. According to Wherry (1967), Texas material belongs to the var. *laphamii* (Wood) A. Gray.

Phlox drummondii Hook.

As treated by Turner (2000), this species is comprised of five intergrading varieties, as shown below; on top of the distribution of these native populations, seeds (or populations) of an additional cultivar, "var. *peregrina* Shinners," have been artificially strewn by wildflower enthusiasts. Finally, it should be noted that natural variations among populations of *Phlox drummondii* have been compounded by its hybridization with *P. cuspidata* (Levin 1967).

Phlox longifolia Nutt.

Texas material of this taxon was unknown to Wherry. The single known collection is from Brewster Co.: foothills of nine-point mesa, on dry arroyo bank, ca. 60 miles south of Alpine, 21 Sept 1966, Correll 33770 (LL). Initially, I took this collection to be an undescribed taxon, although Correll himself had identified this (by annotation in 1969) as *Phlox mesoleuca* E. Greene, while James Henrickson (by annotation, undated) gave it the name "*P. stansburyi* (Torr.) Heller." I consider the latter to be synonymous with *P. longifolia* (s.l.), an earlier name. *Phlox longifolia* is a western species occurring from western Texas to California and northwards to Canada. Nevertheless, more detailed examination of the Texas material may show this to be deserving of formal recognition since the population concerned is rather remote from the mass of the collections of *P. longifolia* known to me.

Phlox nana Nutt. (s.l.)

Wherry (1967) considered this species complex to comprise three species: *Phlox nana*, *P. mesoleuca*, and *P. triovulata* Thurb. & Torrey. In my opinion, the two latter names are but forms of a very variable *P. nana*, the earliest epithet. Indeed, my own field work in the Trans-Pecos region of Texas has convinced me that these several taxa, as recognized by Wherry, are not even worthy of varietal rank. As noted by Wherry in his numerous citations from Brewster County, all three of his so-called species are sympatric, their recognition depending upon one or relatively few characters, namely habit, leaf size and degree of pubescence, characters which are very variable both within and between populations.

Phlox nivalis Lodd.

This species, according to Wherry (1967), is confined to a limited area in southeasternmost Texas. He recognized Texas material as belonging to the subsp.

texensis Lundell. The latter was subsequently elevated to specific rank as *P. texensis* (Lundell) Lundell. Based largely upon its relatively remote distribution from the main mass of the *P. nivalis* complex, Wherry maintained its subspecific rank, although I prefer to treat the populations concerned at the varietal level, *Phlox nivalis* Lodd. var. *texensis* (Lundell) B.L. Turner, *stat. nov.*—Based upon *Phlox nivalis* Lodd. subsp. *texensis* Lundell, Contr. Univ. Michigan Herb. 8:77. 1942.

Phlox oklahomensis Wherry

Wherry (1967) maintained this species, although Shinners (1963) considered it to be a variety of *Phlox bifida* Beck. Wherry, however, reasoned that the single population concerned was but an extension into Texas of his *P. oklahomensis* and not part of *P. bifida*, the principal distribution of which is more eastern (central Arkansas and northeastwards).

Phlox pilosa L.

Wherry (1967) recognized this species to have five infraspecific taxa in Texas: 1) subsp. *pilosa*; 2) subsp. *latisepala* Wherry; 3) subsp. *riparia* Wherry; 4) subsp. *detonsa* (Gray) Wherry; and 5) subsp. *pulcherrima* Lundell. I recognize his subspecies 1 and 4 as being rather typical of var. *pilosa*, populations of which are largely confined to sandy soils of eastern Texas. I consider his subspecies 2 and 3 as indistinguishable, treating these as belonging to a distinct species, *Phlox villosissima*, populations of which are distinguished by their copious glandular pubescence, as noted by Wherry in his key to subspecies. *Phlox villosissima* occurs largely in limestone soils of the Edwards Plateau in central Texas. Wherry's subsp. *pulcherrima* is treated as a distinct species (*cf.* below), as first proposed by Lundell (1945) and maintained by Ferguson *et al.* (1999).

Phlox pulcherrima (Lundell) Lundell

As indicated in the above, this taxon was originally described as a subspecies of *Phlox pilosa*. Ferguson *et al.* (1999) subscribe to its treatment at the specific level, as do I.

Phlox roemeriana Scheele

This common, very distinctive, central Texas endemic is relatively well understood, phylogenetically speaking, thanks to the work of Ferguson *et al.* (1999).

Phlox villosissima (A. Gray) Whitehouse

As indicated under *Phlox pilosa*, this taxon is made up of Wherry's subsp. *latisepala* (type from Kerr County, Texas) and subsp. *riparia* (type from Uvalde County, Texas). When treated at the specific level the earliest name for the category concerned is *P. villosissima*, the latter first proposed as a variety of *P. drummondii* by Asa Gray in 1870.

ACKNOWLEDGMENTS

I am grateful to Carolyn Ferguson for reading the present manuscript and calling to my attention that I had omitted reference to her doctoral dissertation and suggested that I read this so as to become more fully informed of her systematic views. This I did, and cite the same. I am also grateful to Guy Nesom for reviewing the manuscript.

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CYMOPTERIS (APIACEAE) IN TRANS-PECOS, TEXAS

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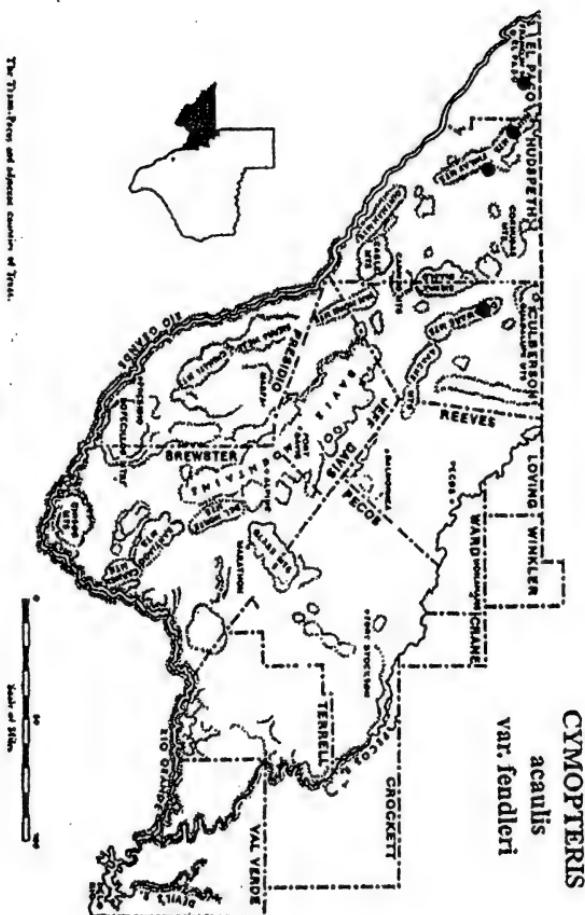
ABSTRACT

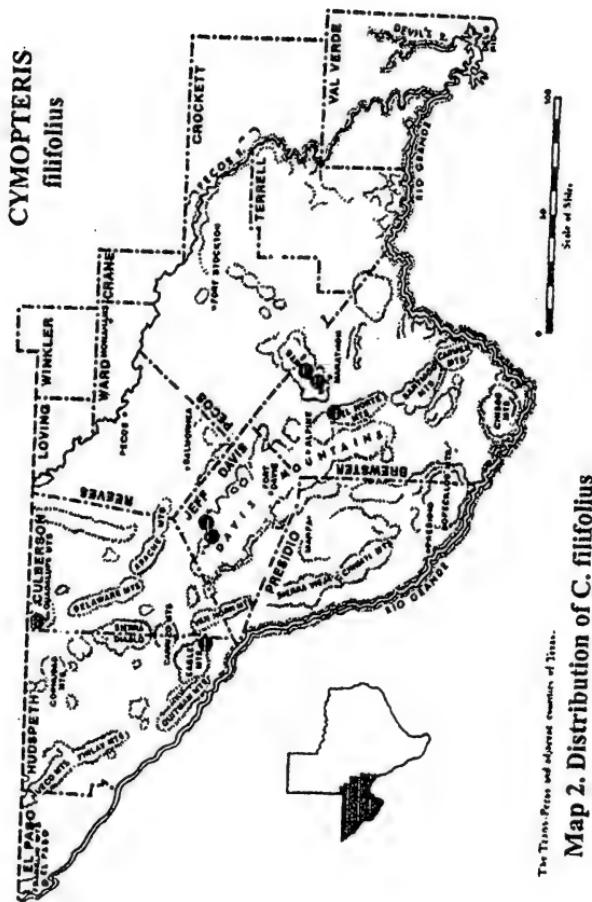
New names and/or combinations are provided for the following apioids of trans-Pecos, Texas: *Cymopteris filifolius* (Mathias *et al.*) B.L. Turner, *comb. nov.* (= *Aletes filifolius* Mathias *et al.*), *Cymopteris hallii* (A. Gray) B.L. Turner, *comb. nov.* [= *Aletes acaulis* (Torrey) Coulter & Rose - not *Cymopteris acaulis* (Pursh) Raf.], *Cymopteris longiradiatus* (Mathias *et al.*) B.L. Turner, *comb. nov.* (= *Pseudocymopteris longiradiatus* Mathias *et al.*). These several species, along with *Cymopteris acaulis* and *C. lemmontii*, constitute the five taxa recognized for Trans-Pecos, Texas. Comments regarding their taxonomy, along with maps showing their distributions, are provided.

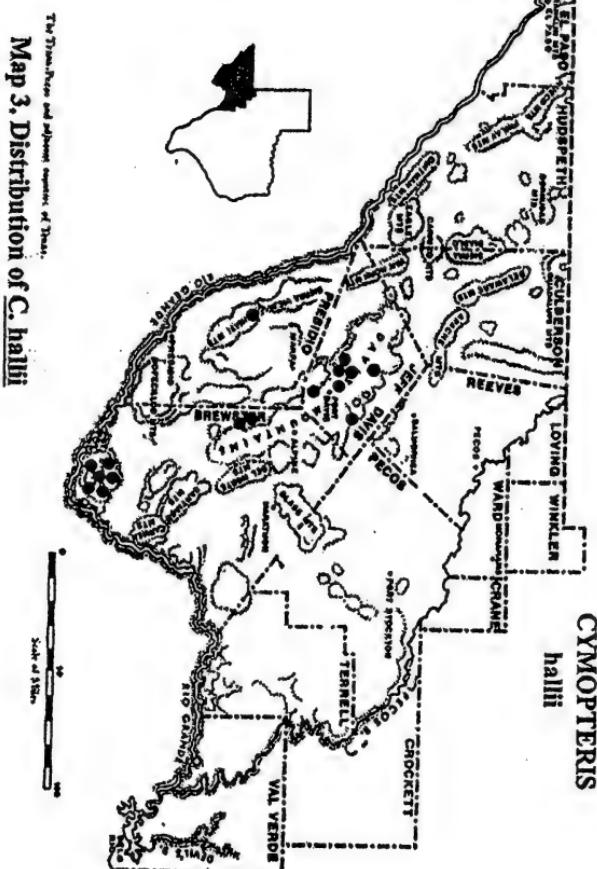
KEY WORDS: *Cymopteris*, Apiaceae, Texas

Generic groupings in the Apiaceae are notoriously volatile, their lines variously drawn on technical characters of the flowers or fruits, most often upon the latter, but sometimes upon such technical features as stem pubescence (e.g., *Cymopteris* vs. *Pseudocymopteris*, cf. Cronquist 1997). That generic lines in the Apiaceae are still in a state of considerable flux can be inferred from the recent DNA studies of the subfamily Apioideae (Katze-Downie *et al.* 1999). The latter workers note that DNA data provide little support for Drude's classical morphological classification of the subfamily nor for alternative classificatory systems using yet other data. In short, Katze-Downie *et al.* state that "the homoplastic nature of many of these nonmolecular characters" has led to much confusion and differences in taxonomic treatments. Hopefully, additional DNA studies will lead to a more stable generic classification of the Apiaceae.

Map 1. Distribution of *C. acaulis* var. *sendtnerii*







With this as an introduction to the name changes concerned, I plunge into unfamiliar taxonomic territory. Fortunately, the name changes proposed in the above abstract largely parallel those of Cronquist (1997) in his treatment of the Apiaceae for the *Intermountain Flora*, although I came to my conclusions without knowledge of his perceptive treatment. Cronquist has presented a compelling case for the inclusion of *Pseudocymopteris* into an enlarged genus *Cymopteris*. In addition, he treated the genus *Aletes* (Mathias *et al.* 1964) within his concept of *Musineon*. I would go further and include all of these into an enlarged *Cymopteris*, the distinction between the latter and *Musineon* being arbitrary at best. Indeed, Constance (1993), the doyen of North American apioids, wryly commented after his generic description of *Cymopteris* that "Generic boundaries [are] fluctuating [in the group]."

The montane regions of Trans-Pecos, as indicated in the above, are currently known to house five species of *Cymopteris*. A key to these follows, along with appropriate comments and maps showing their distribution in the region concerned.

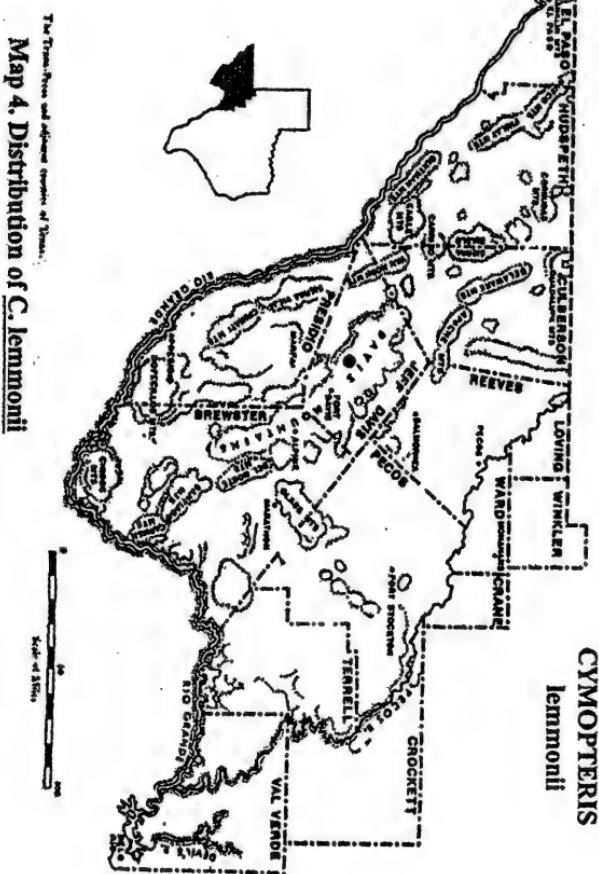
1. Ribs of fruits not winged at maturity, the loments more or less terete or rounded in cross-section, not at all flattened.....*C. hallii*
1. Ribs of fruits not winged at maturity, the loments more or less flattened in cross-section.(2)
 2. Segments of leaves filiform, terete in cross-section.....*C. filifolius*
 2. Segments of leaves flattened, not at all terete.(3)
3. Umbels decidedly involucrate.....*C. acaulis*
3. Umbels scarcely, if at all, involucrate.(4)
 4. Petals yellow; upper slopes of Mt. Livermore, Davis Mountains, Jeff Davis Co.*C. lemmontii*
 4. Petals white, creamy white, to purplish; widespread.*C. longiradiatus*

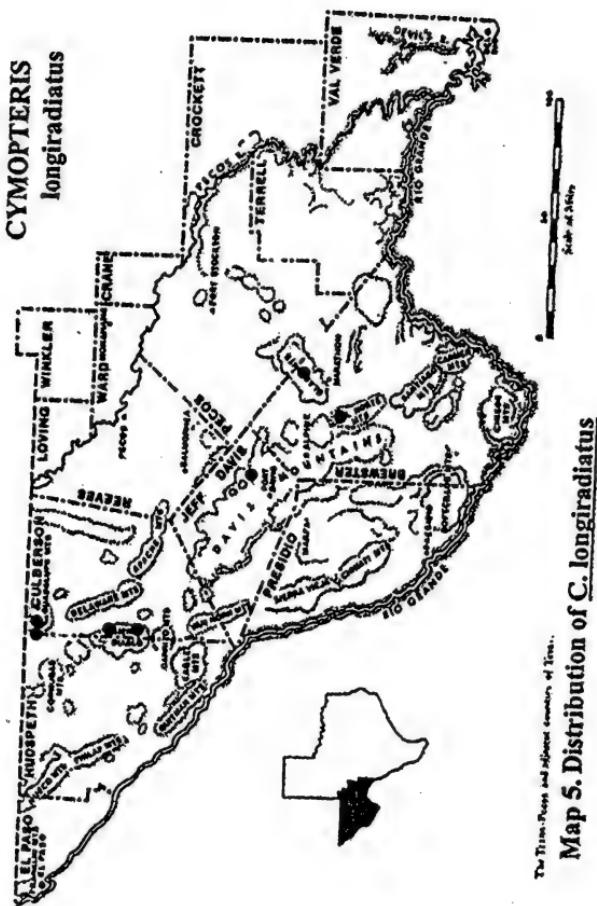
Cymopteris acaulis (Pursh) Raf., *Herb. Raf.* 40. 1833. Map 1.

Cronquist (1997) provided a complete synonymy for this species, noting that three infraspecific taxa are recognized; Trans-Pecos material belongs to the var. *fendleri* (A. Gray) Goodrich.

Cymopteris filifolius (Mathias, Constance & Theobald) B.L. Turner, *comb. nov.*

Map 2. BASIONYM: *Aletes filifolius* Mathias, Constance & Theobald, *Madroño* 20:214. 1969.





Map 5. Distribution of *C. longiradiatus*

This is a very distinct species, although Mathias & Constance (1951) positioned elements of the taxon within their concept *Pseudocymopteris montanus* (A. Gray) Coulter & Rose. Such elements were subsequently (Mathias, Constance & Theobald 1969) elevated to specific rank as *Aletes filifolius* Mathias, Constance & Theobald, although Theobald, Tsenz & Mathias (1963) failed to account for the taxon in their revisionary treatment of *Aletes*. As indicated in my above introductory remarks, I accept Cronquist's submergence of *Aletes* into *Musineon*, but would go further and include the latter into yet a further expanded *Cymopteris*. At least I can find no compelling features that readily distinguish *Aletes* from *Musineon*, nor either of these from the originally positioned *Cymopteris filifolius*.

Cymopteris hallii (A. Gray) B.L. Turner, comb. nov. Map 3. BASIONYM: *Seseli hallii* A. Gray, Proc. Amer. Acad. Arts 8:288. 1870. *Carum hallii* (A. Gray) S. Wats., Bibl. Ind. 416. 1878. *Zizia hallii* (A. Gray) Coulter & Rose, Bot. Gaz. 12:137. 1887.

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Musineon greenei A. Gray, Proc. Amer. Acad. Arts 8:387. 1873.

Aletes obovata Rydb., Bull. Torrey Bot. Club 31:573. 1904.

Cronquist (1997, p. 372), as noted in the above, would position this, the type species of *Aletes*, into the genus *Musineon*, although he did not make the name changes necessary to formalize this repositioning. Personally, I can find little to distinguish between *Aletes* and *Musineon*, nor could Cronquist (199, p. 370), to judge from his remarks regarding their distinctiveness, hence my submergence of *Aletes acaulis* (Torrey) coulter & Rose into *Cymopteris*. There being an earlier *C. acaulis*, I have had to take up the next available name, *C. hallii*, first proposed in 1870 by A. Gray as a member of the genus *Seseli*.

Cymopteris lemmonii (Coulter & Rose) Dorn, Rev. N. Amer. Umbell. 174. 1888. Map 4.

Cronquist (1997) gave a rather lengthy account of this species including a complete synonymy. The taxon was positioned in *Pseudocymopteris* by Mathias & Constance (1965), as *P. montanus*, but I follow Cronquist in placing all of *Pseudocymopteris* (sensu Mathis & Constance) into an expanded *Cymopteris*. So positioned, *P. montanus* takes the name *Cymopteris lemmonii*, there being an earlier *C. montanus*. In the Trans-Pecos area of Texas, *C. lemmonii* is confined to the upper slopes of the second highest peak in the state (Mt. Livermore, ca. 8200 ft.).

Cymopteris longiradiatus (Mathias, Constance & Theobald) B.L. Turner, comb. nov. Map 5. BASIONYM: *Pseudocymopteris longiradiatus* Mathias, Constance & Theobald, Madroño 20:217. 1965.

In their treatment of the Apiaceae of Texas Mathias & Constance (1951) positioned material of this species in their broad concept of *Pseudocymopteris montanus*; the plants concerned were subsequently recognized as belonging to a distinct species, *P. longiradiatus* Mathias, Constance & Theobald. Like Cronquist, I include *Pseudocymopteris* in an enlarged *Cymopteris*, hence the present combination. So far as known, *C. longiradiatus* is confined to Trans-Pecos, Texas and southeasternmost New Mexico.

Finally, it should be noted that both Cronquist (1997) and Welsh *et al.* (1987) accredit *Cymopteris multinervatus* (Coulter & Rose) Tidestrom as occurring in Trans-Pecos, Texas, but I take these reports to be misidentifications of *C. acaulis* var. *fendleri*, the two taxa being superficially very similar.

ACKNOWLEDGMENTS

The dot maps are based upon collections housed at LL, SRSC and TEX. I am grateful to Justin Williams, Steve Siedo and Ronald Hartman for reviewing the manuscript; the latter graciously commented, "Personally, I would not make the transfers that you propose. That does not mean you can't of course."

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A NEW SPECIES OF *VERBESINA* (ASTERACEAE: HELIANTHEAE) FROM NUEVO LEON, MEXICO

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ABSTRACT

Verbesina tamaunuevana B.L. Turner, *spec. nov.*, is described from southern Nuevo León, México. It is closely related to the gypsophilic taxa, *V. aramberrana* B.L. Turner, *V. hintoniorum* B.L. Turner and *V. zaragosana* B.L. Turner, but is readily distinguished from all of these in having markedly bicolored leaves. Additionally, so far as known, it does not occur in gypseous soils. A key to these several taxa is provided, along with a photograph of the type.

KEY WORDS: *Verbesina*, Asteraceae, Heliantheae, México

Preparation of a taxonomic treatment of the Comps of México (Turner 1996, 1997) has occasioned the present paper.

Verbesina tamaunuevana B.L. Turner, *spec. nov.*. Figure 1. TYPE: MEXICO, Nuevo León: Mpio. Dr. Arroyo, below San Josecito, roadside chaparral of oak, cedar and *Comarostaphylis*, 2000 m, 3 Oct 1998, Hinton et al. 27252 (HOLOTYPE: TEX; Isotype: private collection of Hinton family).

Similis *V. hintoniorum* B.L. Turner sed caulis glandulosae pubescentibus et foliis valde bicoloribus.

Perennial rhizomatous herbs 30-40 cm high. Stems purplish, densely and minutely glandular-pubescent, the vestiture ca. 0.2 mm high, among this a smattering of much longer erect to recurved eglandular hairs 0.4-1.0 mm high. Leaves alternate



Fig.1 *Verbesina arroyoana*(holotype)

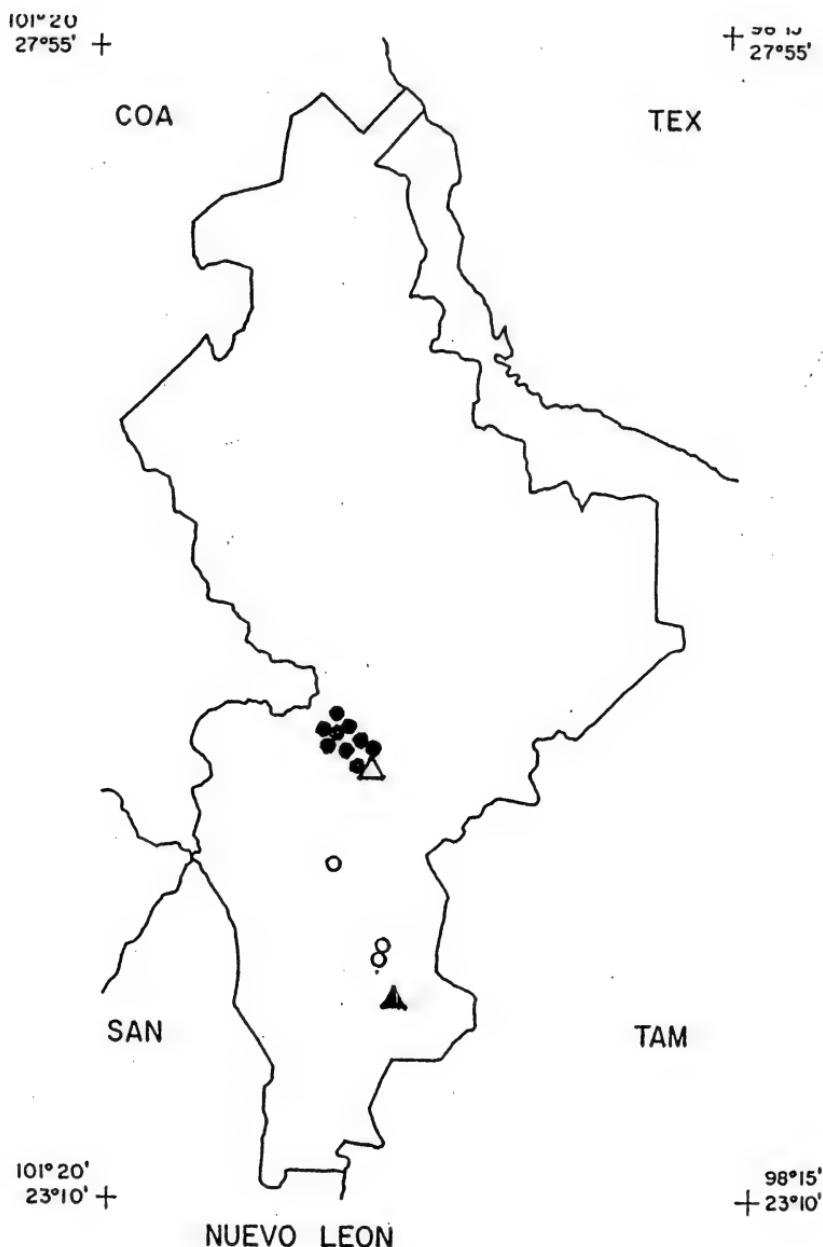


Figure 2. Distribution of *Verbesina tamaunuevana* and cohorts (*V. hintoniorum* closed circle; *V. zaragozana* (open circle); *V. aramberrana* (closed triangle); *V. tamaunuevana* (open triangle)).

throughout, lanceolate, markedly bicolored, sessile or nearly so, gradually reduced upwards, the larger blades 3.5-5.0 cm long, 0.5-0.7 cm wide; lower surfaces densely pubescent with a tangle of ashy-white hairs; upper surfaces dark green, markedly rugose, evenly pubescent with stiff, broad-based, erect to incurved hairs 0.5-1.0 mm long. Ultimate peduncles of the mature heads 3-6 cm long, pubescent like the stems. Involucres campanulate, ca. 6 mm high, 10-12 mm across, the bracts 2-3 seriate, linear, subequal. Receptacle conical, bracteate, ca. 3 mm high, 1.5 mm across, the bracts lanceolate, 5-6 mm long, glabrous or nearly so. Ray florets ca. 13, pistillate, fertile; ligules yellow, 6-8 nervate, 8-11 mm long, 4-6 mm wide. Disk florets numerous (80 or more); corollas yellow, 5-lobed, ca. 3.5 mm long; tube ca. 1.5 mm long, sparsely hirsute; throat ca. 2 mm long; lobes deltoid, ca. 0.7 mm long. Achenes ca. 5 mm long, 3 mm wide (at apex), markedly winged; pappus of 2 fragile scales, each ca. 2 mm long.

Verbesina tamaunuevana is clearly related to the recently described *V. aramberrana* B.L. Turner and cohorts (Figure 2), as noted in the above abstract, all of these occurring in the state of Nuevo León. The following key will serve to distinguish among these:

1. Leaves markedly bicolored; occurring on non-gypseous substrates. *V. tamaunuevana*
1. Leaves not at all bicolored; occurring on gypseous substrates..... (2)
 2. Leaves densely and softly white-tomentose on both surfaces; upper midstem leaves mostly broadly lanceolate, 10-20 mm wide. *V. zaragosana*
 2. Leaves not or but moderately white-tomentose; upper midstem leaves mostly narrowly lanceolate, 4-9 mm wide..... (3)
3. Robust stiffly erect herbs 0.6-1.5 m high; vestiture of leaves, at least in part, of appressed soft hairs; Mpio. Galeana. *V. hintoniorum*
3. Smaller, mostly clumped herbs 0.5-0.6 m high; vestiture of leaves sparse, the hairs coarsely hispid; Mpio. Aramberria..... *V. aramberrana*

Verbesina hintoniorum is known only from the northern parts of Mpio. Galeana (sixteen collections at LL-TEX, all from gypseous substrates); *V. zaragosana* is known only from Mpio. Zaragosana (eight collections, all from gypseous substrates, LL-TEX), except for a single collection (Hinton et al. 18093 [TEX]) from the southeasternmost part of Mpio. Galeana (above El Nogal, ca. Lat 24° 50' N, Long. 100° 05' W); *V. aramberrana* is known by five collections (LL-TEX) all from Mpio. Aramberria in gypseous substrates. It should be noted that at least a few collections of *V. hintoniorum* (Hinton et al. 25645 [TEX]; Hinton et al. 25686 [TEX]; Panero

6867 [TEX]) have a vestiture that of *V. zaragosana*, but in leaf shape, habit, and features of the capitulescence, such plants clearly belong to the former. So far as known, *V. hintoniorum* and *V. zaragosana* do not grow together, but the vestiture characters emphasized in my original description of the latter do appear to vary more than was stated at the time.

The species is named for the two states of México, Tamaulipas and Nuevo León, to which it is likely confined.

ACKNOWLEDGMENTS

I am grateful to my wife Gayle Turner for the Latin diagnosis, and to her and Prof. Justin Williams for reviewing the manuscript.

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EARLY PLEISTOCENE PLANTS FROM THE MIDDLE RIO GRANDE VALLEY OF NEW MEXICO

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ABSTRACT

Recent fossils from New Mexico are reviewed in the context of understanding the history of riparian (bosque) vegetation in the Middle Rio Grande Valley of New Mexico.

KEY WORDS: fossils, paleoecology, New Mexico, bosque, riparian

In recent years, the preservation of the New Mexico Rio Grande cottonwood forest (bosque) has become of prime concern to both biologists and the general public. Although the Rio Grande bosque is now universally accepted as an important resource, little is known about its origins and evolution. Even the recent history of the bosque is obscure. Photographic records and biological data pertaining to the Rio Grande in New Mexico did not appear until the early part of the twentieth century (Van Cleave 1935). Consequently, speculation on the origin and antiquity of the bosque has been quite varied and generally unsubstantiated by data.

Axelrod (1948) speculated that much of the modern southwestern vegetation may have developed by the Pliocene, about 5 million years ago. Axelrod & Bailey (1976) later speculated that ancestors of modern plant species in the rift valleys of New Mexico may extend back to the mid-Miocene. Meyers (1983) documented a number of Neogene fossil plants from New Mexico that bear similarities to modern floras. Although these reports provide insight and data into the potential origin of the New

Mexico rift valley flora, none of these reports documented evidence as to the actual antiquity and composition of the early Rio Grande bosque.

Recent fossil finds recovered from the Tijeras site located in Albuquerque, New Mexico at UTM Zone 13 Northing 3678150, Easting 351650, provide evidence of a well-developed Rio Grande bosque (Knight, Lucas & Cully 1996) by the early Pleistocene (Irvingtonian land-mammal "age", about 1.2-1.4 Mya). The fossil plants described here were deposited at the New Mexico Museum of Natural History (NMMNH) in Albuquerque, NM. The plant fossils of the Tijeras site represent the earliest indication of the modern Rio Grande cottonwood forest. An abundance of fossils of broad-leaf cottonwood and contemporary willow species at the site indicates that the early Pleistocene Rio Grande bosque forest may have been structurally similar to the contemporary bosque. The assemblage of species recovered from the Tijeras site suggests that the early Pleistocene floodplain of the Rio Grande was populated by stands of *Populus fremontii* S. Wats., and *Populus angustifolia* James ex Long (cottonwood), intermixed with *Prunus* (cherry) and *Celtis* (hackberry). Shrubby taxa, including *Rosa* (rose) and *Crataegus* (hawthorn), occurred within the forest. The canopy forest was interrupted by active river channels and static bodies of water. These channels and ponds were lined by several species of *Salix* (willow) including *Salix amygdaloidea* Anders., *S. exigua-interior*, and *S. gooddingii* Ball. The edges of ponds supported stands of *Typha* (cattail). The higher portions of the floodplain likely supported *Quercus* (oak). Many of the genera represented in the Tijeras flora (*Prunus*, *Quercus*, *Rosa*, and *Crataegus*) do not occur in the current Rio Grande bosque, but have been displaced to adjacent drainages at higher elevations.

Although the composition of the flora from the Tijeras site suggests a slightly cooler and wetter environment than presently exists at that site, there can be no doubt about the similarity of the Tijeras paleoflora to the flora of the modern Rio Grande bosque. These findings document a well-developed early Pleistocene woodland in the Middle Rio Grande Valley. For centuries, New Mexico's Rio Grande bosque has been the center of the region's cultural development.

These new findings document that this woodland has been an important component of the ecology of the area for more than a million years.

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BOOKS RECEIVED

A Festschrift in Honor of John J. Wurdack. Laurence J. Dorr & Basil Stergios D. (eds.). BioLlania Edición Especial No. 6, BioCentro de la UNELLEZ, Congreso de la República de Venezuela, Caracas, Venezuela. 1997. xi. 571 pp. Price unknown. ISBN 980-231-131-6 (paper).

A series of papers designed to honor Dr. John J. Wurdack. Author of more than 130 papers, Wurdack has spent the majority of his career at the Smithsonian Institution and has conducted extensive fieldwork in South America.

A Field Guide to the Families and Genera of Woody Plants of Northwest South America (Colombia, Ecuador, Peru), with Supplementary Notes on Herbaceous Taxa. Alwyn H. Gentry. The University of Chicago Press, 5801 S. Ellis Ave., Chicago, Illinois 60637, United States. 1996. xxiv. 895 pp. \$75.00 (hardcover); \$45.00 (paper). ISBN 0-226-28943-5 (hardcover); 0-226-28944-3 (paper).

This is a second printing of a work first published in 1993. While retaining all the content of the first printing, the second printing has been reduced in size in order to facilitate field use. The family keys are not the typical dichotomous keys, but instead are multiple entry keys that allow a user to arrive at a family designation more efficiently in most instances. The key to orchid genera is of the more familiar dichotomous type, while the other entries to genera parallel the method for families.

A Guide to Species, Irises: Their Identification and Cultivation. Species Group of the British Iris Society (eds.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1997. xvi. 371 pp. \$105.00 (hardcover). ISBN 0-521-44074-2.

This monographic work complies information about *Iris*. There are introductory chapters about *Iris* in history, cultivation of *Iris*, and *Iris* chromosomes. By far the largest and most important part of this book is the monographic work. In this section, the species of *Iris* are nested into hierarchies of subgenus, section and series (where applicable). The species treatments include synonymy, distribution, description, cultivation, and a section referred to as "observations". The observations may include anything from personal observations of the author(s) of the treatment to literature reviews. For those species having infraspecific taxonomy, a portion of the species treatment covers this topic.

A Manual of California Vegetation. John O. Sawyer & Todd Keeler-Wolf. California Native Plant Society, 1722 J Street, Suite 17, Sacramento, California 95814, United States. 1995. iv. 471 pp. \$55.00 (hardcover); \$39.00 (paper). ISBN 0-943460-25-5 (hardcover); 0-943460-26-2 (paper).

This is a groundbreaking work in the sense that it provides comprehensive descriptions for vegetation series from such a large and vegetationally diverse state. Each series is described in full. The descriptions include dominant plants, soils, topography, distribution, elevation ranges, crosswalks to earlier vegetation classification systems, literature references, commentary, and species lists. Additional information and/or illustrations are found for many of the series. Keys assist with understanding the relationships between the series. A significant inclusion in the book is the Appendix, in which is found data collection protocols for vegetation sampling. This information allows extension of the methods used in producing content for this book, to be applied in other regions.

A Naturalist's Guide to the Arctic. E.C. Pielou. The University of Chicago Press, 5801 S. Ellis Ave., Chicago, Illinois 60637, United States. 1994. xvi. 344 pp. \$19.95 (paper). ISBN 0-226-66813-4 (hardcover); 0-226-66814-2 (paper).

This book is designed as a comprehensive field guide and would be an excellent travelling companion for anyone making a trip to the Arctic and interested in experiencing as much of the Arctic's natural history during that trip. Early sections of the book consider the physical factors (light, climate, landforms, oceans) that impact the Arctic biota. The remainder of the book is devoted to separate chapters on the plants, birds, mammals, fish and insects of the Arctic.

Ainsworth & Bisby's Dictionary of the Fungi, eighth edition. D.L. Hawksworth, P.M. Kirk, B.C. Sutton & D.N. Pegler (eds.). International Mycological Institute, an institute of Centre for Agriculture and Biosciences (CAB) International, available from Oxford University Press, 198 Madison Avenue, New York, New York 10016, United States. 1996. xii. 616 pp. \$49.95 (hardcover). ISBN 0-85198-885-7.

This is not merely a dictionary, but is more encyclopedic in content. Many of the entries have extensive text and most have bibliographic references as well. In addition to the dictionary entries, the book contains keys to fungal families.

Algal Ecology, Freshwater Benthic Ecosystems. R. Jan Stevenson, Max L. Bothwell & Rex L. Lowe (eds.). The Aquatic Ecology Series, Academic Press Inc., 525 B Street, Suite 1900, San Diego, California 92101-4495, United States. 1996. xxvi. 753 pp. \$84.95 (hardcover). ISBN 0-12-668450-2.

This book is organized into three sections. Section one examines patterns of algae in aquatic ecosystems and includes papers on algal ecology, algae in streams, algae in lakes and algae in wetlands. The second section examines physical and biological impacts on benthic algae and includes papers on light, temperature, nutrients, competition, substrates, current, heterotrophy, herbivory, disturbance, pH, toxic organics and toxic inorganics. Section three relates benthic freshwater algae to the ecosystems in which they occur, and includes papers on food webs, nutrient cycling, ecological modeling and use of algal communities as monitors.

Amino Acids and Their Derivatives in Higher Plants, Society for Experimental Biology Seminar Series 56. R.M. Wallsgrove (ed.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1995. xiv. 280 pp. \$64.95 (hardcover). ISBN 0-521-45453-0.

A series of papers presented at a meeting at Rothamsted Experimental Station in 1993, examine the substantial role of amino acids in higher plants. The majority of the papers examine the activity of specific amino acids (e.g., glutamine, proline, glycine, serine, etc.) in a particular metabolic pathway or plant system (e.g., ethylene generation, endosperm, cyanogenesis, etc.). Knowledge of amino acid activity in protein formation and structure is largely assumed.

An Introduction to Arthropod Pest Control. J.R.M. Thacker. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 2002. xvi. 343 pp. \$80.00 (hardcover); \$30.00 (paper). ISBN 0-521-56106-x (hardcover); 0-521-56787-4 (paper).

An historical review of arthropod pest control is followed by a review of botanical insecticides. A summary of synthetic insecticides precedes a chapter on side effects of insecticides. Biological pest control, microbial pest control and use of pheromones and growth regulators for pest control fill the next four chapters. The final five chapters review genetic manipulation, host resistance, cultural control methods, integrated pest management and biotechnology as methods for controlling arthropod pests.

Anales del Instituto de Biología, Serie Botánica, vol. 65, number 1. Mario Sousa Sánchez (ed.). Coordinador de la Biblioteca del Instituto de Biología, Universidad Nacional Autónoma de México, Apartado Postal 70-233, 04510 México, D.F., México. 1994. pp. 1-76. Price unknown. ISSN 0374-5511.

Two articles describing new species in different sections of *Euphorbia* (Euphorbiaceae) are found in this volume. Also included are a taxonomic review of *Ramirezella* (Leguminosae), and floristic and geographic notes of a cloud forest in Hidalgo. The volume concludes with a review of the distribution of mangroves and sea grasses in the Gulf of California.

Anales del Instituto de Biología, Serie Botánica, vol. 66, number 1. Fernando Chiang Cabrera (ed.). Coordinador de la Biblioteca del Instituto de Biología, Universidad Nacional Autónoma de México, Apartado Postal 70-233, 04510 México, D.F., México. 1995. pp. 1-112. Price unknown. ISSN 0374-5511.

Three papers make up this issue of Anales. The first examines the phylobenthos of Terminos Lagoon, the second fossil palms of México and the third describes a new species of *Merremia* (Convolvulaceae).

Anales del Instituto de Biología, Serie Botánica, vol. 66, number 2. Fernando Chiang Cabrera (ed.). Coordinador de la Biblioteca del Instituto de Biología, Universidad Nacional Autónoma de México, Apartado Postal 70-233, 04510 México, D.F., México. 1995. pp. 113-191. Price unknown. ISSN 0374-5511.

Two papers including new species or new combinations are included. A wood anatomical study of *Quercus* and a leaf morphological study of

Arenaria are also in this issue. The other two papers are a developmental study of *Amaranthus* and a review of the distribution of *Echinopepon*.

Anales del Instituto de Biología, Serie Botánica, vol. 67, number 1. Fernando Chiang Cabrera (ed.). Coordinador de la Biblioteca del Instituto de Biología, Universidad Nacional Autónoma de México, Apartado Postal 70-233, 04510 México, D.F., México. 1996. pp. 1-226. Price unknown. ISSN 0374-5511.

The twenty papers of this volume constitute the proceedings of the International Bryological Conference entitled Tropical Bryophytes: Biology, Diversity and Conservation. The conference was held August 7-12, 1995 in México City.

Anatomy of the Monocotyledons, VIII Iridaceae. Paula Rudall. Clarendon Press, Oxford Science Publications, 198 Madison Avenue, New York, New York 10016, United States. 1995. viii. 126 pp. \$135.00 (hardcover). ISBN 0-19-854504-5.

After initial introductory material on ontogeny and structure of stems, roots and leaves, most of the remainder of the book consists of leaf anatomy descriptions. The descriptions are arranged in subfamilies and tribes, and are written to emphasize the systematic relationships among the groups.

Applications of PCR in Mycology. P.D. Bridge, D.K. Arora, C.A. Reddy & R.P. Elander (eds.). Centre for Agriculture and Biosciences (CAB) International, available from Oxford University Press, 198 Madison Avenue, New York, New York 10016, United States. 1998. xvi. 357 pp. Price unknown (hardcover). ISBN 0-85199-233-1.

Use of polymerase chain reaction is assessed for various aspects of mycology. The papers examine gene cloning, screening for gene expression, species definition, biodiversity, phylogeny, and fungal-plant interactions.

Architechture and Inner Structure of the Coriandrum sativum L. Júlia Szukó-Lacza, translated from Hungarian by G. Oláh. Akadémiai Kiadó és Nyomda Vállalat, Budapest, Hungary. Available from International Specialized Book Services, Inc., 5804 N.E. Hassalo Street, Portland, Oregon 97213-3644, United States. 1994. ii. 109 pp. \$15.00 (paper). ISBN 963-05-6771-7.

This monograph of coriander consists of a brief summary of coriander in historic records, systematic position, literature review and background information about the main focus of the book—anatomy and morphology of coriander. Separate treatments are presented for leaves and leaf parts, flowers and floral parts, roots, stems and seeds.

At the Desert's Green Edge: An Ethnobotany of the Gila River Pima. Amadeo M. Rea. The University of Arizona Press, 1230 N. Park Avenue, Suite 102, Tucson, Arizona 85719-4140, United States. 1997. xxviii. 430 pp. \$60.00 (hardcover). ISBN 0-8165-1540-9.

This is a massively comprehensive book in that it goes well beyond the typical ethnobotanical offering by including substantial information about the culture and language of the people whose ethnobotany is studied. Well over 200 plants are treated and the work includes some plants only recently used by the Pima (e.g., fruits of Eurasian origin).

Australian Vegetation, second edition. R.H. Groves (ed.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1994. xviii. 562 pp. \$79.95 (hardcover); price unknown (paper). ISBN 0-521-41420-2 (hardcover); 0-521-42476-3 (paper).

Eighteen papers by 23 authors cover major vegetation types, specialized vegetation types, and vegetation conservation. In addition to the focus on native vegetation, the impact of alien vegetation is also examined. An initial section provides a contextual background by reviewing Quaternary Australian vegetation and the phytogeography of the Australian region.

Bananas and Plantains, Crop Production Science in Horticulture 5. J.C. Robinson. Centre for Agriculture and Biosciences (CAB) International, available through Oxford University Press, 198 Madison Avenue, New York, New York 10016, United States. 1996. viii. 238 pp. \$39.95 (paper). ISBN 0-85198-985-3.

This is a comprehensive summary of information about cultivation of *Musa*. Introductory chapters on distribution, classification and morphology are followed by a larger number of chapters on the actual cultivation process. These include chapters on site selection, fertilization, irrigation, weed control, pruning, propagation, diseases, pests, harvesting and ripening.

Biología de la Reproducción de la Tribu Delphinieae a la Mediterránea Occidental. Maria Bosch I Daniel. Institut d'Estudis Catalans Publications, Carrer del Carme, 47, E-08001 Barcelona, Spain. 1999. 375 pp. 3500 peseta (paper). ISBN 84-7283-451-4.

The thirty species of Delphinieae found in the western Mediterranean region are studied to assess their reproductive biology. The thirty species are distributed among the genera *Delphinium*, *Aconitum* and *Consolida*. Floral morphology, pollination biology, breeding systems, cytogenetics and isozyme electrophoresis are used to compare the species studied.

Biological Indicators of Soil Health. C.E. Pankhurst, B.M. Doube & V.V.S.R. Gupta (eds.). Centre for Agriculture and Biosciences (CAB) International, available from Oxford University Press, 198 Madison Avenue, New York, New York 10016, United States. 1997. xii. 451 pp. \$80.00 (hardcover). ISBN 0-85199-158-0.

Four introductory papers begin this volume and set the context for later papers on specific aspects of soil health. The specific indicators examined include biomass, enzyme activity, microflora, root pathogens, microfauna, arthropods, macrofauna, biodiversity and plants. Three additional papers look at the use of bioindicators to detect heavy metals, chemical assessment of soil biota, and use of genetically engineered microbes as biosensors. The final paper offers a synthesis of biological indicators of soil health.

Boletín del Instituto de Botánica, época 3, vol. 3, números 1-3. Roberto González Tamayo (ed.). Departamento de Botánica y Zoología, Herbario del Instituto de Botánica, Universidad de Gauadalajara, Apartado Postal 139, 45110 Zapopan, Jalisco, México. Diciembre 1995. 148 pp. \$25 annual subscription. ISSN 0187-7054.

Eleven papers cover topics from an inventory of mushrooms in the Sierra de Quila to descriptions of new species of *Habenaria*. Papers are in either Spanish or English with abstracts in both languages.

Bonplandia, Revista del Instituto de Botánica del Nordeste, vol. 6, number 4. Carmen L. Cristóbal (ed.). Instituto de Botánica del Nordeste, Facultad de Ciencias Agrarias, Universidad Nacional del Nordeste, Casilla de Correo 209, 3400 Corrientes, Argentina. June 1993. pp. 211-262. Price unknown. ISSN 0524-0476.

Sapindaceae is the focus of this issue, as both articles deal with this family. The first article reviews the pollen of tribe Paullinieae, and the second includes a new species and new combination in *Cardiospermum*. The issue concludes with an index to volume 6.

Bonplandia, Revista del Instituto de Botánica del Nordeste, vol. 7, numbers 1-4. Carmen L. Cristóbal (ed.). Instituto de Botánica del Nordeste, Facultad de Ciencias Agrarias, Universidad Nacional del Nordeste, Casilla de Correo 209, 3400 Corrientes, Argentina. 1993. pp. 1-184. Price unknown. ISSN 0524-0476.

Ten papers comprise this volume. The topics include six papers describing new species and/or making new combinations. Three papers on cytological or cytogenetic studies and a paper on floral anatomy of Turneraceae are also part of this volume.

Bradea, Boletin do Herbarium Bradeanum, index to vol. 4. Margarete Emmerich (ed.). Herbarium Bradeanum, Caixa Postal 15005, CEP 20.031, Rio de Janeiro, RJ, Brasil. June 1988. pp. 73-85. Price unknown. ISSN 0084-800x.

The index is a series of two indices. The first is organized by major taxonomic groups and topics, and includes full article citations. The second is a more traditional genus/species index with references only to page numbers.

Bradea, Boletin do Herbarium Bradeanum, vol. 5, number 7. Margarete Emmerich (ed.). Herbarium Bradeanum, Caixa Postal 15005, CEP 20.031, Rio de Janeiro, RJ, Brasil. June 1988. pp. 73-85. Price unknown. ISSN 0084-800x.

Portuguese text is supplemented by an English abstract. The single paper in this issue reviews annual variation of cyanogenesis in a number of species of Orchidaceae.

Bradea, Boletin do Herbarium Bradeanum, vol. 5, number 8. Margarete Emmerich (ed.). Herbarium Bradeanum, Caixa Postal 15005, CEP 20.031, Rio de Janeiro, RJ, Brasil. July 1988. pp. 86-90. Price unknown. ISSN 0084-800x.

This paper is entitled "A teoria do Dianthos – uma nova interpretação sobre a morfologia floral de *Heliconia*".

Bradea, Boletin do Herbarium Bradeanum, vol. 5, number 9. Margarete Emmerich (ed.). Herbarium Bradeanum, Caixa Postal 15005, CEP 20.031, Rio de Janeiro, RJ, Brasil. August 1988. pp. 90-107. Price unknown. ISSN 0084-800x.

This paper is entitled "Lentibulariaceae do Brasil. II. Utriculárias epífitas".

Bradea, Boletin do Herbarium Bradeanum, vol. 5, number 10. Margarete Emmerich (ed.). Herbarium Bradeanum, Caixa Postal 15005, CEP 20.031, Rio de Janeiro, RJ, Brasil. August 1988. pp. 108-124. Price unknown. ISSN 0084-800x.

This paper is entitled "Anatomia foliar de *Aspidosperma pyricollum* Muell. Arg. (Apocynaceae)".

Bradea, Boletin do Herbarium Bradeanum, vol. 5, number 11. Margarete Emmerich (ed.). Herbarium Bradeanum, Caixa Postal 15005, CEP 20.031, Rio de Janeiro, RJ, Brasil. October 1988. pp. 125-135. Price unknown. ISSN 0084-800x.

This paper is entitled "O gênero *Utricularia* L. no Brasil. II. Espécies da região norte".

Bradea, Boletin do Herbarium Bradeanum, vol. 5, number 12. Margarete Emmerich (ed.). Herbarium Bradeanum, Caixa Postal 15005, CEP 20.031, Rio de Janeiro, RJ, Brasil. November 1988. pp. 136-148. Price unknown. ISSN 0084-800x.

This paper is entitled "Antomia foliar de *Mandevilla funiformis* (Vell.) K. Schum. (Apocynaceae)".

Bradea, Boletin do Herbarium Bradeanum, vol. 5, number 13. Margarete Emmerich (ed.). Herbarium Bradeanum, Caixa Postal 15005, CEP 20.031, Rio de Janeiro, RJ, Brasil. December 1988. pp. 149-151. Price unknown. ISSN 0084-800x.

This paper is entitled "Species novae in Brasilia Vochysiacearum".

Bradea, Boletin do Herbarium Bradeanum, vol. 5, number 14. Margarete Emmerich (ed.). Herbarium Bradeanum, Caixa Postal 15005, CEP 20.031, Rio de Janeiro, RJ, Brasil. January 1989. pp. 152-155. Price unknown. ISSN 0084-800x.

This paper is entitled "Genlisea lobata Fromm-Trinta - Uma nova espécie para o gênero Genlisea St.-Hil. sect. Tayloria (Lentibulariaceae)".

Bradea, Boletin do Herbarium Bradeanum, vol. 5, number 15. Margarete Emmerich (ed.). Herbarium Bradeanum, Caixa Postal 15005, CEP 20.031, Rio de Janeiro, RJ, Brasil. February 1989. pp. 156-165. Price unknown. ISSN 0084-800x.

This paper is entitled "Anatomia foliar de *Ficus organensis* (Miq.) Miq.".

Bradea, Boletin do Herbarium Bradeanum, vol. 5, number 16. Margarete Emmerich (ed.). Herbarium Bradeanum, Caixa Postal 15005, CEP 20.031, Rio de Janeiro, RJ, Brasil. March 1989. pp. 166-187. Price unknown. ISSN 0084-800x.

This paper is entitled "Novas Bromeliáceas nativas do Brasil - VI".

Bradea, Boletin do Herbarium Bradeanum, vol. 5, number 17. Margarete Emmerich (ed.). Herbarium Bradeanum, Caixa Postal 15005, CEP 20.031, Rio de Janeiro, RJ, Brasil. April 1989. pp. 188-195. Price unknown. ISSN 0084-800x.

This paper is entitled "O gênero *Utricularia* L. no Brasil. III. Espécies da região nordeste".

Bradea, Boletin do Herbarium Bradeanum, vol. 5, number 18. Margarete Emmerich (ed.). Herbarium Bradeanum, Caixa Postal 15005, CEP 20.031, Rio de Janeiro, RJ, Brasil. May 1989. pp. 196-204. Price unknown. ISSN 0084-800x.

This paper is entitled "Espécies de *Sapium* P.Br. (Euphorbiaceae) que ocorrem no estado de Mato Grosso".

Bradea, Boletin do Herbarium Bradeanum, vol. 5, number 19. Margarete Emmerich (ed.). Herbarium Bradeanum, Caixa Postal 15005, CEP 20.031, Rio de Janeiro, RJ, Brasil. June 1989. pp. 205-242. Price unknown. ISSN 0084-800x.

This paper is entitled "Lythraceae austroamericanae. Addenda et corrigenda III".

British Plant Communities, volume 1, Woodlands and Scrub. J.S. Rodwell (ed.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-

4211, United States. 1998. x. 540 pp. \$160.00 (hardcover); \$54.95 (paper). ISBN 0-521-23558-8 (hardcover); 0-521-62721-4 (paper).

Fifteen years of field work has provided the core data set for this five volume series. In all, more than 250 plant communities are described. The descriptions include species lists, vegetation structure, synonymy, physiognomy, subcommunities, habitat, zonation and succession, distribution—including range maps and affinities with other communities.

British Plant Communities, volume 2, Mires and Heaths. J.S. Rodwell (ed.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1998. x. 628 pp. \$195.00 (hardcover); \$54.95 (paper). ISBN 0-521-39165-2 (hardcover); 0-521-62720-6 (paper).

Volume 2 examines mires and heaths. Mires are defined as permanently wet (but most often lacking standing water) communities composed of bryophytes, herbs and subshrubs. Heaths are defined as those communities dominated by subshrubs.

British Plant Communities, volume 3, Grasslands and Montane Communities. J.S. Rodwell (ed.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1998. x. 540 pp. \$195.00 (hardcover); \$54.95 (paper). ISBN 0-521-39166-0 (hardcover); 0-521-62719-2 (paper).

Volume 3 examines three major groupings of grasslands. These are the mesotrophic grasslands, calcicolous grasslands and calcifugous grasslands/montane communities.

British Plant Communities, volume 4, Aquatic Communities, Swamps and Tall-Herb Fens. J.S. Rodwell (ed.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1998. xii. 283 pp. \$105.00 (hardcover); \$54.95 (paper). ISBN 0-521-39168-7 (hardcover); 0-521-62718-4 (paper).

Volume 4 examines communities characterized by standing water. As with many other distinctions in the series, transitions exist between community groups, and these transitions are particularly apparent between communities included here as swamps/fens, and aquatic communities in the wetter directions and mires in the drier direction.

Cherries: Crop Physiology, Production and Uses. A.D. Webster & N.E. Looney (eds.). Centre for Agriculture and Biosciences (CAB) International, available from Oxford University Press, 198 Madison Avenue, New York, New York 10016, United States. 1996. x. 513 pp. \$155.00 (hardcover). ISBN 0-85198-936-5.

This monograph of cultivated cherries contains an abundance of information for anyone interested in growing or just learning about cherries. Introductory papers summarizing taxonomy, cultivation history and worldwide distribution of cherry production are followed by a series of papers focused on aspects of cherry cultivation. These papers are organized into five groups. Group one examines scions, rootstocks and cultivar origins. Growth and cultivation is the focus of the next group, including papers on propagation, site selection, fertilization, fruit production, pruning, irrigation and use of bioregulators. Crop protection is the theme for the next group of papers with topics such as weed control, diseases, insect pests, and bird and rain damage. The final group examines harvesting, handling, and use of the fruit.

Chinese Journal of Applied and Environmental Biology, vol. 1, number 1. Liu Zhaoguang (ed.). Science Press, Chengdu Institute of Biology, Academia Sinica, Chengdu 610041, Sichuan, P.R. China. 1995. 102 pp. 8 yuan. ISSN 1006-687x.

A new periodical created to publish the biological and environmental sciences researches of scientists at the Chengdu Institute of Biology, the *Journal* is written primarily in Chinese, but contains English versions of abstracts and table of contents. The initial issue contains thirteen articles including mutants in maize seed proteins, transient genetic expression in *Orychophragmus*, selection in cell lines of celery, callus formation in *Rhodiola*, regeneration from potato culture, *Bupleurum* pollen morphology, microbial degradation of nitrile, biotreatment of chlorinated hydrocarbons, halophilic bacteria, biological removal of phosphorus, effect of *Polygonatum* metabolites on *Drosophila*, solid state fermentation, and biomedical use of poly beta-hydroxybutyrate.

Chinese Journal of Applied and Environmental Biology, vol. 1, number 2. Liu Zhaoguang (ed.). Science Press, Chengdu Institute of Biology, Academia Sinica, Chengdu 610041, Sichuan, P.R. China. 1995. 102 pp. 8 yuan. ISSN 1006-687x.

This issue focuses on physiological aspects of rice production, anaerobic bacterial physiology, and bacterial interactions with plants. Additional articles on pond ecology and water purification are also included.

Chinese Journal of Applied and Environmental Biology, vol. 1, number 3. Liu Zhaoguang (ed.). Science Press, Chengdu Institute of Biology, Academia Sinica, Chengdu 610041, Sichuan, P.R. China. 1995. 102 pp. 8 yuan. ISSN 1006-687x.

Photosynthetic capability of radish and *Litchi*, phytogeography of *Taxus*, effect of calcium carbonate application on heavy metal accumulation in vegetables, effects of garbage compost on plant growth, and use of magnetized fertilizer on apples accompany several papers on bacterial physiology comprise this issue.

Chinese Journal of Applied and Environmental Biology, vol. 1, number 4. Liu Zhaoguang (ed.). Science Press, Chengdu Institute of Biology, Academia Sinica, Chengdu 610041, Sichuan, P.R. China. 1995. 112 pp. 8 yuan. ISSN 1006-687x.

This issue is devoted to examination of various sources of compost on plant growth and soil characteristics, taxonomy of *Tetrastigma*, ecology of *Picea* on Gongga Mountain, wheat proteins, and subtropical ecosystem restoration.

Chinese Journal of Applied and Environmental Biology, vol. 2, number 1. Liu Zhaoguang (ed.). Science Press, Chengdu Institute of Biology, Academia Sinica, Chengdu 610041, Sichuan, P.R. China. 1996. 108 pp. 11 yuan. ISSN 1006-687x.

Topics of papers of this issue include gene expression, protoplast culture, efficiency of solar radiation absorption, forest community structure, forest restoration, interspecific competition among shrubs, and description of new species of Vitaceae.

Chinese Journal of Applied and Environmental Biology, vol. 2, number 2. Liu Zhaoguang (ed.). Science Press, Chengdu Institute of Biology, Academia Sinica, Chengdu 610041, Sichuan, P.R. China. 1996. 96 pp. 11 yuan. ISSN 1006-687x.

Cell culture and effects of various environmental contaminants are the focus of the botanical papers in this issue. The papers include both field studies and laboratory experiments.

Chinese Journal of Applied and Environmental Biology, vol. 2, number 3. Liu Zhaoguang (ed.). Science Press, Chengdu Institute of Biology, Academia Sinica, Chengdu 610041, Sichuan, P.R. China. 1996. 122 pp. 11 yuan. ISSN 1006-687x.

The botanical contents of this issue include heavy metal accumulation by mangroves, bioactivity of *Millettia*, cell culture of *Taxus*, nitrogen fixation in *Sesbania* and a number of other plant physiological papers.

Chinese Journal of Applied and Environmental Biology, vol. 2, number 4. Liu Zhaoguang (ed.). Science Press, Chengdu Institute of Biology, Academia Sinica, Chengdu 610041, Sichuan, P.R. China. 1996. 106 pp. 11 yuan. ISSN 1006-687x.

A study of the foliar epidermis of *Polystichum* is the only non-physiological botanical paper in this issue.

Chinese Journal of Applied and Environmental Biology, vol. 3, number 1. Liu Zhaoguang (ed.). Science Press, Chengdu Institute of Biology, Academia Sinica, Chengdu 610041, Sichuan, P.R. China. 1997. 94 pp. 11 yuan. ISSN 1006-687x.

Papers ranging from heavy metal accumulation in *Zea*, to revegetation of steppe, to descriptions of new species of *Cyrtomium* are included in this issue.

Chinese Journal of Applied and Environmental Biology, vol. 3, number 2. Liu Zhaoguang (ed.). Science Press, Chengdu Institute of Biology, Academia Sinica, Chengdu 610041, Sichuan, P.R. China. 1997. 94 pp. 11 yuan. ISSN 1006-687x.

Taxonomy of *Polystichum* sect. *Xiphopolystichum* and new taxa in *Tetraplostigma* are the papers of botanical systematics interest in this issue.

Common Families of Flowering Plants. Michael Hickey & Clive King. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1996. xii. 212 pp. \$64.95 (hardcover); \$22.95 (paper). ISBN 0-521-57281-9 (hardcover); 0-521-57609-1 (paper).

Representatives from 25 common plant families are illustrated in this book. The illustrations are black and white line drawings with extensively annotated captions. In addition to the illustrations are introductory botanical information and an extensive glossary. The book would be very useful for introducing botanical topics to students interested in learning more about any aspect of botany.

Container Gardening Through the Year. Malcolm Hillier. Dorling Kindersley Publishing, 95 Madison Avenue, New York, New York 10016, United States. 1995. 160 pp. \$24.95 (hardcover). ISBN 1-56458-869-6.

This is a wonderful book for anyone who enjoys growing plants in containers in and around their home. The book is organized on a seasonal basis, with sections for all four seasons of the year. Within each seasonal summary, are subsections with ideas that may be used in various parts of the home (e.g., windows, patios, steps, doorways). The introduction contains some basic information that is useful not only for beginners, but also to facilitate use of the remainder of the book.

Contribution to Indian Ethnobotany, third edition. S.K. Jain. Scientific Publishers, 5-A New Pali Road, P.O. Box 91, Jodhpur 342 001, India. 1997. xvi. 322 pp. \$50.00 (hardcover). ISBN 81-7233-150-9.

A total of 32 papers have been contributed by 34 authors. While the majority of these papers focus on the medical properties of the plants, a number of them examine religious uses, foods, literature, and dyes.

Cucurbits, Crop Production Science in Horticulture 6. R.W. Robinson & D.S. Decker-Walters. Centre for Agriculture and Biosciences (CAB) International, available through Oxford University Press, 198 Madison Avenue, New York, New York 10016, United States. 1997. viii. 226 pp. \$40.00 (paper). ISBN 0-85199-133-5.

A general review of cucurbits is followed by a summary of evolution and commercial use of this group of plants. Genetics and breeding of cucurbits is followed by a summary of the major crops of Cucurbitaceae. Further

chapters cover cultural requirements, fruit and seed production and diseases and pests of cucurbits.

Cuscatlania, vol. 1, number 6, *Listado Básico de la Flora Salvadorensis, Monocotyledoneae: Iridaceae, Commelinaceae, Gramineae, Cyperaceae*. Walter G. Berendshon & Ana Elizabeth Araniva de González. Jardín Botánico La Laguna, Urbanización Industrial La Laguna, Antiguo Cuscatlán, Depto La Libertad, Apdo. Post. 2260 C.G., San Salvador, El Salvador. August 1991. 30 pp. Price unknown. ISSN 1017-8430.

The series is dedicated to the Salvadoran flora. This issue is a draft checklist of Iridaceae, Commelinaceae, Gramineae and Cyperaceae. The checklist is annotated with references to publications and specimens and the text is in English.

Cuscatlania, vol. 1, number 7, *Listado Básico de la Flora Salvadorensis, Dicotyledoneae: Moraceae, Urticaceae, Proteaceae, Olacaceae, Ophiaceae, Loranthaceae, Balanophoraceae, Polygonaceae*. Walter G. Berendshon & Ana Elizabeth Araniva de González. Jardín Botánico La Laguna, Urbanización Industrial La Laguna, Antiguo Cuscatlán, Depto La Libertad, Apdo. Post. 2260 C.G., San Salvador, El Salvador. October 1992. 14 pp. Price unknown. ISSN 1017-8430.

This issue is a draft checklist of Moraceae, Urticaceae, Proteaceae, Olacaceae, Ophiaceae, Loranthaceae, Balanophoraceae and Polygonaceae. The checklist is annotated with references to publications and specimens and the text is in English.

Cuscatlania, vol. 1, number 8, *Listado Básico de la Flora Salvadorensis, Monocotyledoneae: Alismataceae, Arecaceae, Cannaceae, Haemodoraceae, Hypoxidaceae, Lemnaceae, Limnocharitaceae, Pontederiaceae, Potamogetonaceae, Smilacaceae*. Walter G. Berendshon. Jardín Botánico La Laguna, Urbanización Industrial La Laguna, Antiguo Cuscatlán, Depto La Libertad, Apdo. Post. 2260 C.G., San Salvador, El Salvador. April 1993. 10 pp. Price unknown. ISSN 1017-8430.

This issue is a draft checklist of Alismataceae, Arecaceae, Cannaceae, Haemodoraceae, Hypoxidaceae, Lemnaceae, Limnocharitaceae, Pontederiaceae, Potamogetonaceae and Smilacaceae. The checklist is annotated with references to publications and specimens and the text is in English.

Cuscatlania, vol. 1, number 9, *Listado Básico de la Flora Salvadorensis, Monocotyledoneae 3: Agavaceae, Alliaceae, Aloaceae, Alstormeriaceae, Anthericaceae, Asparagaceae, Bromeliaceae, Colchicaceae, Convallariaceae, Cyclanthaceae, Dioscoreaceae, Dracaenaceae, Helioconiaceae, Hemerocallidaceae, Hydrocharitaceae, Juncaceae, Liliaceae, Melianthiaceae.* Walter G. Berendshon. Jardín Botánico La Laguna, Urbanización Industrial La Laguna, Antiguo Cuscatlán, Depto La Libertad, Apdo. Post. 2260 C.G., San Salvador, El Salvador. May 1995. 17 pp. Price unknown. ISSN 1017-8430.

This issue is a draft checklist of Agavaceae, Alliaceae, Aloaceae, Alstormeriaceae, Anthericaceae, Asparagaceae, Bromeliaceae, Colchicaceae, Convallariaceae, Cyclanthaceae, Dioscoreaceae, Dracaenaceae, Helioconiaceae, Hemerocallidaceae, Hydrocharitaceae, Juncaceae, Liliaceae and Melianthiaceae. The checklist is annotated with references to publications and specimens and the text is in English.

Cuscatlania, vol. 2, *Botánica Medicinal Popular Etnobotánica Medicinal de El Salvador.* Julio César González Ayala. Jardín Botánico La Laguna, Urbanización Industrial La Laguna, Antiguo Cuscatlán, Depto La Libertad, Apdo. Post. 2260 C.G., San Salvador, El Salvador. January 1994. vi. 189 pp. Price unknown. ISSN 1017-8430.

This extensive compilation of ethnobotanical practices in El Salvador is primarily a listing by disease. Each disease listing includes a description of the ailment and ethnobotanical treatment(s). The ethnobotanical treatments include the plant source, preparation method, mode of administration, and dosage. The initial pages in the book are devoted to a summary of ethnobotanical history and practice in El Salvador.

Diversity and Evolutionary Biology of Tropical Flowers. Peter K. Endress. Cambridge University Press, Tropical Biology Series, 40 West 20th Street, New York, New York 10011-4211, United States. 1994. xiv. 511 pp. \$84.95 (hardcover). ISBN 0-521-42088-1.

This book purports to be one of the few that examines the features of tropical flowers—such study having previously been focused primarily on flowers of temperate regions. The end notes state that the first part of the volume deals with general structural and biological features of flowers, while the second part focuses on the flowers of selected tropical plant groups.

Trends in the study of floral evolution and the role of flowers in the study of flowering plant evolution are also outlined.

Diversity and Evolutionary Biology of Tropical Flowers. Peter K. Endress. Cambridge University Press, Tropical Biology Series, 40 West 20th Street, New York, New York 10011-4211, United States. 1996. xiv. 511 pp. \$37.95 (paper). ISBN 0-521-56510-3.

This paperback printing is a corrected version of the hardcover edition.

Ernstia, vol. 3, number 1. Prof. Baltasar Trujillo (ed.). Herbario de la Facultad de Agronomía de la Universidad Central de Venezuela, Maracay, Apartado Postal 4579, Maracay, 2101, Venezuela. June 1993. Pp. 1-60. 500 Venezuela Bs. ISSN 0252-8274.

The initial article in this volume covers the algal genus *Gelidialla* (Rhodophyta). Articles describing *Inga cardozana* (Leguminosae) and *Ramalina reducta* (Lichens) accompany a monograph on the *Inga* species of the Henri Pittier National Park to round out the major articles of this issue. A note on historic perspectives of conservation and botany of Venezuela completes the issue.

Ernstia, vol. 3, number 2. Prof. Baltasar Trujillo (ed.). Herbario de la Facultad de Agronomía de la Universidad Central de Venezuela, Maracay, Apartado Postal 4579, Maracay, 2101, Venezuela. October 1993. Pp. 61-100. 500 Venezuela Bs. ISSN 0252-8274.

One paper in this issue describes new and interesting Asclepiadaceae of Venezuela and Guyana. A second constitutes a catalog of some of the genera of Papilionoideae in Venezuela. Two notes complete the issue.

Ernstia, vol. 3, numbers 3, 4 and annex. Prof. Baltasar Trujillo (ed.). Herbario de la Facultad de Agronomía de la Universidad Central de Venezuela, Maracay, Apartado Postal 4579, Maracay, 2101, Venezuela. January 1994. Pp. 101-166 + 1-52 in annex. 1000 Venezuela Bs. ISSN 0252-8274.

Six papers in this issue describe new species and/or make new combinations. Another paper constitutes a catalog of some of the genera of Papilionoideae in Venezuela. Two notes complete the issue. Three floristic

papers round out the issue. The annex is a catalog of periodicals in the library at the University in Maracay.

Ernstia, vol. 4, numbers 1 and 2. Prof. Baltasar Trujillo (ed.). Herbario de la Facultad de Agronomía de la Universidad Central de Venezuela, Maracay, Apartado Postal 4579, Maracay, 2101, Venezuela. September 1994. Pp. 1-72. 1000 Venezuela Bs. ISSN 0252-8274.

New species or new combinations are made in two papers. Another paper is a floristic work on Venezuelan Cactaceae, and the other paper is a chemical and microstructural study of *Psilocybe montana*.

Ernstia, vol. 4, numbers 3 and 4. Prof. Baltasar Trujillo (ed.). Herbario de la Facultad de Agronomía de la Universidad Central de Venezuela, Maracay, Apartado Postal 4579, Maracay, 2101, Venezuela. November 1994. Pp. 73-140. 1000 Venezuela Bs. ISSN 0252-8274.

Eight papers and two notes comprise this issue. Most of the papers are floristic works illuminating new species found in various regions. Two papers describe new taxa.

Ernstia, vol. 5, number 1. Prof. Baltasar Trujillo (ed.). Herbario de la Facultad de Agronomía de la Universidad Central de Venezuela, Maracay, Apartado Postal 4579, Maracay, 2101, Venezuela. July 1995. Pp. 1-48. 1000 Venezuela Bs. ISSN 0252-8274.

A description of the lichen databases LIQANDES and LIQAMAZ is the highlight article of this volume. The other major article describes two species and a subspecies of *Doliocarpus* (Dilleniaceae). Shorter articles/notes provide information on the *Flora de la Guyana Venezolana*, history of the herbarium MYF, the second Venezuelan Botanical Congress, the twelfth Latin American Mycological Congress, and recently published books.

Ernstia, vol. 5, number 2. Prof. Baltasar Trujillo (ed.). Herbario de la Facultad de Agronomía de la Universidad Central de Venezuela, Maracay, Apartado Postal 4579, Maracay, 2101, Venezuela. July 1995. Pp. 49-88. 1000 Venezuela Bs. ISSN 0252-8274.

This volume contains the first of a series of articles on *Opuntia* anatomy. Other articles include a treatment of fungi found on mango and descriptions of new species in *Ayapana* and *Chromolaena* (Compositae).

Ethnobotany and the Search for New Drugs, Ciba Foundation Symposium 185. Derek J. Chadwick & Joan Marsh (eds.). John Wiley & Sons, Inc., 605 Third Avenue, New York, New York 10158-0012, United States. 1994. x. 280 pp. \$76.00 (hardcover). ISBN 0-471-95024-6.

The frontpiece alternatively lists this as symposium 185 and 186. In any case, the volume is comprised of papers discussed during a symposium held in Fortaleza, Brasil in 1993. Various papers review ethnobotanical activities in a number of countries around the world. It is possible that the most influential papers in the book will be the last five, in which the serious issues of intellectual property, conservation, law and sociology are examined.

Eucalypt Ecology: Individuals to Ecosystems. Jann E. Williams & John C.Z. Woinarski (eds.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1997. xii. 430 pp. \$150.00 (hardcover). ISBN 0-521-49740-x.

Sixteen papers by 26 authors cover many aspects of *Eucalyptus* ecology. Preceding the papers on ecology proper are papers on phylogeny, reproductive biology, genetics and biogeography. Topics of the ecology papers include modeling, fires, ecophysiology, nutrient cycling, fungal interactions, interactions with other vascular plants, invertebrate interactions, vertebrate interactions and ecosystem conservation.

European Garden Flora: A Manual for the Identification of Plants in Europe, both Out-of-Doors and Under Glass, volume 5, Dicotyledons (Part III): Limnanthaceae to Oleaceae. J. Cullen, J.C.M. Alexander, C.D. Briskell, J.R. Edmondson, P.S. Green, V.H. Heywood, P.-M. Jørgensen, S.L. Jury, S.G. Knees, V.A. Matthews, H.S. Maxwell, D.M. Miller, E.C. Nelson, N.K.B. Robson, S.M. Walters & P.F. Yeo (eds.). Cambridge University Press, Studies in Biology Series, 40 West 20th Street, New York, New York 10011-4211, United States. 1997. xx. 646 pp. \$155.00 (hardcover). ISBN 0-521-42096-2.

The fifth of a planned six volumes, this is the standard for identification of cultivated plants in Europe. While based on scientific principles, the work is written with non-technical terminology in order to make it as useful as possible for the informed lay person.

Feeding the Ten Billion: Plants and Population Growth. L.T. Evans. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1998. xiv. 247 pp. \$54.95 (hardcover); \$19.95 (paper). ISBN 0-521-64081-4 (hardcover); 0-521-64685-5 (paper).

Its publication corresponding with the 200th anniversary of Malthus' *Essay on the Principle of Population*, this book examines the issues surrounding feeding the expanding human population of the world. In fact, the majority of the text reviews how the earth's human population was fed as it grew through a series of population milestones since 8000 BC. It is only in the final chapter that the extrapolation is made to feeding a future population of ten billion.

Flora of Great Britain and Ireland, Volume 5, Butomaceae—Orchidaceae. Peter Sell & Gina Murrell (eds.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1996. xxx. 410 pp. \$100.00 (hardcover). ISBN 0-521-55339-3.

Although volume 5, this is the first of this series to be published, it is planned as the final volume of the completed project. The current work is seen not as a competitor with, but a complement to, Stace's *New Flora of the British Isles*, published in 1991. The species descriptions are complete, and do well to reach the goal of producing "a picture of the plant [that] unfolds before you as you read it. I look forward to seeing the remaining volumes of this work.

Flora of the Gran Desierto and Rio Colorado Delta. Richard S. Felger. The University of Arizona Press, 355 S. Euclid Avenue, Suite 103, Tucson, Arizona 85719, United States. 2000. xii. 673 pp. \$75.00 (hardcover). ISBN 0-8165-2044-5.

This flora treats the relatively small, but remarkably diverse Gran Desierto region of western Sonora and northeastern Baja California Norte. The descriptions are ample, even including specimen citations as well as the typical morphological traits and habitat information. Line drawings and half-tone illustrations supplement the text.

Flora Sichuanica, volume 3. Fang Wen-Pei (ed.). Sichuan Jenmin Press, Chengdu Institute of Biology, Academia Sinica, Chengdu, Sichuan, People's Republic of China. 1985. vi. 309 pp. 5.15 yuan (paper). ISBN unknown.

This volume 3 includes treatments of Myricaceae, Juglandaceae, Salicaceae, Ulmaceae, Phytolaccaceae, Basellaceae, Tropaeolaceae, Rhamnaceae, Stachyuraceae, Diapensiaceae and Ebenaceae. With the exception of Latin names, the book is almost entirely in Chinese.

Flora Sichuanica, volume 4. Chang Che-yung (ed.). Sichuan Jenmin Press, Chengdu Institute of Biology, Academia Sinica, Chengdu, Sichuan, People's Republic of China. 1988. vi. 493 pp. 7.85 yuan (paper). ISBN 7-5364-0784-x.

This volume 4 includes treatments of Chenopodiaceae, Eupteleaceae, Actinidiaceae, Pittosporaceae, Coriariaceae, Anacardiaceae, Sabiaceae, Aquifoliaceae, Celastraceae, Elaeocarpaceae, Punicaceae, Polemoniaceae, Convolvulaceae and Bignoniaceae. With the exception of Latin names, the book is almost entirely in Chinese.

Flora Sichuanica, volume 7. Xu Jie-mei (ed.). Sichuan Jenmin Press, Chengdu Institute of Biology, Academia Sinica, Chengdu, Sichuan, People's Republic of China. 1991. vi. 416 pp. Price unknown (hardcover). ISBN 7-5409-0179-9.

This volume 7 includes treatments of Liliaceae. With the exception of Latin names, the book is almost entirely in Chinese.

Flora Sichuanica, volume 8. Xiong Ji-hua (ed.). Sichuan Jenmin Press, Chengdu Institute of Biology, Academia Sinica, Chengdu, Sichuan, People's Republic of China. 1989. vi. 571 pp. 15.4 yuan (paper). ISBN 7-5409-0417-8.

This volume 8 includes treatments of Casuarinaceae, Eucommiaceae, Nyctaginaceae, Portulacaceae, Amaranthaceae, Schizandraceae, Sargentodoxaceae, Lardizabalaceae, Menispermaceae, Theaceae, Capparidaceae, Oxalidaceae, Polypalaceae, Bretschneideraceae, Sapindaceae, Caricaceae, Myrtaceae, Myrsinaceae, Apocynaceae, Solanaceae, Agavaceae, Commelinaceae and Cannaceae. With the exception of Latin names, the book is almost entirely in Chinese.

Flora Sichuanica, volume 9. Kao Pao-chung & Tan Zhong-ming (eds.). Sichuan Jenmin Press, Chengdu Institute of Biology, Academia Sinica, Chengdu,

Sichuan, People's Republic of China. 1992. vi. 687 pp. 27.2 yuan (paper); 30.7 yuan (hardcover). ISBN 7-5409-0901-3 (paper).

This volume 9 includes treatments of Proteaceae, Droseraceae, Geraniaceae, Zygophyllaceae, Rutaceae, Malvaceae, Thymelaeaceae, Stemonaceae, Acanthochlamydaceae, Amaryllidaceae, Hypoxidaceae, Iridaceae, Araceae and Lemnaceae. With the exception of Latin names, the book is almost entirely in Chinese.

Flora Sichuanica, volume 10. Li Hsi-wen & Zhu Zheng-yin (eds.). Sichuan Jenmin Press, Chengdu Institute of Biology, Academia Sinica, Chengdu, Sichuan, People's Republic of China. 1989. vi. 544 pp. 14.3 yuan (paper). ISBN 7-5409-0426-7.

This volume 10 includes treatments of Aristolochiaceae, Cucurbitaceae, Labiate, Phrymataceae, Campanulaceae and Zingiberaceae. With the exception of Latin names, the book is almost entirely in Chinese.

Flora Sichuanica, volume 11. Zhou Bang-Kai (ed.). Sichuan Jenmin Press, Chengdu Institute of Biology, Academia Sinica, Chengdu, Sichuan, People's Republic of China. 1994. vi. 186 pp. 18 yuan (paper). ISBN 7-5364-0795-5.

This volume 11 includes treatments of Tiliaceae and Caprifoliaceae. With the exception of Latin names, the book is almost entirely in Chinese.

Fungal Conservation, Issues and Solutions. D. Moore, M.M. Nauta, S.E. Evans & M. Rotheroe (eds.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 2001. x. 262 pp. \$95.00 (hardcover). ISBN 0-521-80363-2.

Fungal conservation involves not only the fungus, but also the host/substrate upon which the fungus grows. A total of 28 authors have contributed 22 papers to this volume. These papers were prepared in part for a symposium held at Kew Gardens in November 1999, and others for a symposium at the XIIIth Congress of European Mycologists held in September 1999 at Alcala de Henares, Spain.

Gardening with Native Plants of the Pacific Northwest, second edition. Arthur R. Kruckeberg. University of Washington Press, P.O. Box 50096, Seattle,

Washington 98145-5096, United States. 1997. xii. 282 pp. \$35.00 (paper). ISBN 0-295-97476-1.

This is a revised and enlarged version from the first edition. Organization of the book revolves around habit, with major sections on trees, shrubs, herbaceous forbs, and grasses and grass-like plants. Introductory material includes discussion of natural environments of the Pacific Northwest, uses of native plants and propagation of native plants.

Gazeteer of China, An Index to the Atlas of the People's Republic of China. Academia Sinica Press, Beijing, People's Republic of China. 1996. 14 + 316 pp. 20 yuan (paper). ISBN 7-5031-1718-4.

This is a critically useful book for anyone working with the flora of China. Although principally in Chinese characters, the gazeteer itself also has the Pinyin transliterations, and the latitude/longitude notations and map coordinates are numeric. The combination of Chinese characters, Pinyin names and numeric coordinates makes the information useful even for those who do not know the Chinese characters.

Gentry's Río Mayo Plants, The Tropical Deciduous Forest & Environs of Northwest Mexico. Revised and edited by Paul S. Martin, David Yetman, Mark Fishbein, Phil Jenkins, Thomas R. Van Devender & Rebecca K. Wilson. The University of Arizona Press, 1230 N. Park Avenue, Suite 102, Tucson, Arizona 85719-4140, United States. 1998. xvi. 558 pp. \$75.00 (hardcover). ISBN 0-8165-1726-6.

Although fundamentally based on Gentry's 1942 work, this book builds significantly on that foundation. More than double the number of species are included. Also, comparisons are possible between the Río Mayo of Gentry's early visits and the current state of the region.

Gongga Shan Zhibei. Liu Zhaoguang (ed.). Sichuan Jenmin Press, Chengdu Institute of Biology, Academia Sinica, Chengdu, Sichuan, People's Republic of China. 1985. 234 pp. 7.8 yuan (hardcover). ISBN unknown.

Due to its massive size, Gongga Mountain has an important influence on the regional climate of southwestern Sichuan and therefore has an impact on the flora of the region. This book treats a number of the species found on the mountain. While the majority of the text is Chinese, there is an English table of contents and summary.

Guide to the Vascular Plants of Florida. Richard P. Wunderlin. The University of Florida Press, 15 NW 15th Street, Gainesville, Florida 32611-2079, United States. 1998. x. 806 pp. \$35.00 (hardcover). ISBN 0-8130-1556-1.

This volume represents the first modern floristic treatment of the entire state of Florida. More than 4000 species are included. The book contains keys and brief species treatments for each species. The species treatments are limited to common name, habitat, distribution, phenology and limited synonymy. Had the descriptions been any more lengthy, the size of the book would have expanded significantly. Although a multivolume work on the flora of Florida is planned, the present book will remain a mainstay even after publication of that later series.

Healing with Plants in the American and Mexican West. Margarita Artschwager Kay. The University of Arizona Press, 1230 N. Park Avenue, Suite 102, Tucson, Arizona 85719-4140, United States. 1996. xviii. 315 pp. \$50.00 (hardcover); \$19.95 (paper). ISBN 0-8165-1645-6 (hardcover); 0-8165-1646-4 (paper).

This book has a focus on use of plants for treating illnesses of women and children and is a derivative of the author's Ph.D. dissertation research. The listings of medically active plants are well organized and more extensive than those of many books on the same subject. Plant names include Spanish, Native American and English names. Both modern and historic uses are considered. The phytochemical section of the medicinal plant descriptions includes discussion of the plant metabolites that produce the medical activity.

History of the Australian Vegetation, Cretaceous to Recent. Robert S. Hill (ed.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1994. x. 433 pp. \$125.00 (hardcover). ISBN 0-521-40197-6.

The end notes indicate that this book presents a detailed synopsis of the events that led to evolution of the unique Australian flora. The first part of the book deals the past continental relationships and physiographic characteristics of Australia. The latter part of the book of the paleobotanical/palynological record of Australia.

Horticultural Reviews, vol. 16. Prof. Jules Janick (ed.). John Wiley & Sons, Inc., 605 Third Avenue, New York, New York 10158-0012, United States. 1994. xvi. 406 pp. \$110.00 (hardcover). ISBN 0-471-57337-x; ISSN 0163-7851.

A total of 21 authors have contributed eight papers to this volume. Topics of the papers include study of plant hormone action, salt tolerance, truffle cultivation, seed priming, sapindaceous fruits, apple flavor, grape pruning and mechanical harvest of berries.

Index Herbariorum Sinicorum. Fu Li-Kuo (ed.). China Science and Technology Press, 32 Baishiqiao Rd., Haidian District, Beijing 100081, People's Republic of China. 1993. x. 458 pp. Price unknown (paper). ISBN 7-5046-1161-1.

This volume presents information about 318 of the herbaria in China. Each summary includes address, contact information, date of origin, number of specimens, and important collections. The listings are included both in Chinese and in English.

Information Technology, Plant Pathology and Biodiversity. Peter Bridge, Peter Jeffries, David R. Morse & Peter R. Scott (eds.). Centre for Agriculture and Biosciences (CAB) International in association with the British Society for Plant Pathology and the Systematics Association, available from Oxford University Press, 198 Madison Avenue, New York, New York 10016, United States. 1998. xiv. 478 pp. \$90.00 (hardcover). ISBN 0-85199-217-x.

From the initial chapters on information technology and computer-based systematics, to the final chapters on a prospective view of biology and information technology, this book is packed with information and ideas for using modern information handling tools to attack biological problems. Major sections include data handling, data interpretation, use of data in decision making, computer-based species identification, conveyance of knowledge through education and knowledge storage and dissemination.

Introduction to Plant Physiology. William G. Hopkins. John Wiley & Sons, Inc., 605 Third Avenue, New York, New York 10158-0012, United States. 1995. xvi. 464 pp. \$79.95 (hardcover). ISBN 0-471-54547-3.

This book is an introductory text in plant physiology. As such, it contains a breadth of information about plant cells and metabolism of those cells. Later parts of the book combine the cellular features into whole organisms. The volume is abundantly illustrated, both in black and white, and color.

Introduction to Plant Physiology, second edition. William G. Hopkins. John Wiley & Sons, Inc., 605 Third Avenue, New York, New York 10158-0012, United States. 1998. xvi. 512 pp. \$97.95 (hardcover). ISBN 0-471-19281-3.

Although basically the same as the first edition, this second edition is revised to clarify certain areas and there are significant additions to the text.

Marine Botany, second edition. Clinton J. Dawes. John Wiley & Sons, Inc., 605 Third Avenue, New York, New York 10158-0012, United States. 1998. xiv. 480 pp. \$79.95 (hardcover). ISBN 0-471-19208-2.

This textbook is geared toward upper level undergraduate students and beginning graduate students. Initial chapters examine some of the biotic and abiotic influences on marine plants. Then, various communities of marine plants are treated. The appendices include information on experimental methods for marine plants and economic uses for algae.

Molecular and Cellular Aspects of Plant Reproduction, Society for Experimental Biology Seminar Series 55. R.J. Scott & A.D. Stead (eds.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1995. xii. 315 pp. \$69.95 (hardcover). ISBN 0-521-45525-1.

Seventeen papers have been included from 39 authors. These papers focus on molecular control of various aspects of flowering, ranging from floral and pollen morphogenesis to phenology.

Molecular Embryology of Flowering Plants. V. Raghavan. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1997. xxii. 690 pp. \$150.00 (hardcover). ISBN 0-521-55246-x.

Major sections in this book include gametogenesis, pollination and fertilization, zygotic embryogenesis, adventive embryogenesis and genetic transformation. The book is extensively referenced and abundantly illustrated. The subject treatments are thorough and clearly written.

Molecular Genetics of Plant Development. Stephen H. Howell. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1998. xviii. 365 pp. \$85.00 (hardcover); \$39.95 (paper). ISBN 0-521-58255-5 (hardcover); 0-521-58784-0 (paper).

This textbook for advanced undergraduates or beginning graduate students is designed to present plant development in the context of current molecular genetic methods. The book focuses on organ-level effects of molecular action as opposed to cellular or organismic effects.

Napaea, vol. 8. J.I. Bergonci, R.M. Bueno, B.E. Irgang, J.A. Jarenkow, S.L.C. Leite, L.A. Mentz, P.L. Oliveira, & M. Sobral (eds.). Revista Napaea, Caixa Postal 9012, Universidade Federal do Rio Grande do Sul, 90042-970 Porto Alegre, RS, Brasil. June 1992. Pp. 1-32. Price unknown. ISSN 0102-7808.

While Portuguese is the primary language of this journal, abstracts are also included in English. Volume 8 includes a new species of *Hyptis* (Labiatae), taxonomic and ecological summaries of marine algae, trichome morphology of *Solanum*, a morphological/anatomical study of *Trichilia* leaves, and a new species of *Dioscorea* (Dioscoreaceae).

Napaea, vol. 9. J.I. Bergonci, S.A.L. Bordignon, R.M. Bueno, B.E. Irgang, J.A. Jarenkow, S.L.C. Leite, L.A. Mentz, P.L. Oliveira, & M. Sobral (eds.). Revista Napaea, Caixa Postal 9012, Universidade Federal do Rio Grande do Sul, 90042-970 Porto Alegre, RS, Brasil. June 1993. Pp. 1-42. Price unknown. ISSN 0102-7808.

A new species of *Pilea*, new record of *Roupala*, legumes of Região, and a synopsis of *Myrciaria* highlight this volume.

Napaea, vol. 10. S.A.L. Bordignon, R.M. Bueno, B.E. Irgang, J.A. Jarenkow, S.L.C. Leite, L.A. Mentz, P.L. Oliveira, & M. Sobral (eds.). Revista Napaea, Caixa Postal 9012, Universidade Federal do Rio Grande do Sul, 90042-970 Porto Alegre, RS, Brasil. March 1994. Pp. 1-32. Price unknown. ISSN 0102-7808.

This volume features new species in *Plinia* and *Vernonia*, range extensions for *Xylaria* and *Aspidosperma*, and leaf anatomical studies of *Octomeria* and *Sophronitis*.

Napaea, vol. 11. S.A.L. Bordignon, R.M. Bueno, B.E. Irgang, J.A. Jarenkow, S.L.C. Leite, L.A. Mentz, P.L. Oliveira, & M. Sobral (eds.). Revista Napaea, Caixa Postal 9012, Universidade Federal do Rio Grande do Sul, 90042-970 Porto Alegre, RS, Brasil. March 1995. Pp. 1-36. Price unknown. ISSN 0102-7808.

All three papers in this volume contain descriptions of new species and/or new combinations.

Nematode Vectors of Plant Viruses. C.E. Taylor & D.J.F. Brown. Centre for Agriculture and Biosciences (CAB) International, available from Oxford University Press, 198 Madison Avenue, New York, New York 10016, United States. 1997. xii. 286 pp. \$80.00 (hardcover). ISBN 0-85199-159-9.

Taylor & Brown examine this important topic first by providing a historical context, then by delving into various aspects of the problem. Chapters are included on morphology, taxonomy, distribution, and ecology of the nematodes. These are followed with a transitional chapter on the interactions of nematodes with their plant hosts. The remainder of the book treats the topics of nematode-transmitted viruses, virus transmission, mechanisms of transmission control of nematodes (and thus the transmitted viruses) and methodology of the study of viral/nematode interactions.

New Flora of the British Isles, second edition. Clive Stace. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1997. xxx. 1130 pp. \$85.00 (softcover). ISBN 0-521-58935-5.

This is an expanded version of the first edition. The cover is plastic in order to increase durability during field use. The keys and descriptions are easy to use. An extensive glossary facilitates their use.

Nitrogen Fixation, third edition. John Postgate. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1998. viii. 112 pp. \$54.95 (hardcover); \$19.95 (paper). ISBN 0-521-64047-4 (hardcover); 0-521-64853-x (paper).

Written as an introductory summary of nitrogen fixation, this book begins with the nitrogen cycle. It then moves to a review of nitrogenase and the physiological mechanisms of nitrogen fixation. Free-living microbial fixation is reviewed, as is fixation via symbiotic relationships with plants. Preceding the final chapter on future prospects for nitrogen fixation is a chapter examining the genetics and evolution of nitrogen fixation.

Organelle Genes and Genomes. Nicholas W. Gillham. Oxford University Press, 200 Madison Avenue, New York, New York 10016, United States. 1994. xii.

424 pp. \$39.95 (paper). ISBN 0-19-508247-8 (hardcover); 0-19-508248-6 (paper).

Extrachromosomal DNA has important implications for many facets of contemporary biology. This book comprehensively reviews the subject and provides the basis for focusing additional research. Introductory material reviews basic structure and function of mitochondria and chloroplasts. This section is followed by discussions of organelle genome evolution, organelle genetics, and genetic expression of organelles.

Our Changing Climate, The McGraw-Hill Horizons of Science Series. Robert Kandel, translated from the French by Nicholas Hartmann. McGraw-Hill, Inc., 1221 Avenue of the Americas, New York, New York 10020, United States. 1992. 126 pp. Price unknown. ISBN 0-07-033710-1 (paper).

A review of climate change, this book touches the topics of global warming, effects of ozone depletion, and the possibility of a new Ice Age. Reviews of the types of data and instruments used to monitor climate change are also included in the book.

Photosynthesis, fifth edition. D.O. Hall & K.K. Rao. Cambridge University Press, Studies in Biology Series, 40 West 20th Street, New York, New York 10011-4211, United States. 1994. xiv. 211 pp. \$39.95 (hardcover); \$14.95 (paper). ISBN 0-521-43036-4 (hardcover); 0-521-43622-2 (paper).

This textbook provides a comprehensive treatment of the photosynthetic process. The text is amply supplemented with illustrations—both the expected black and white drawings and half-tone illustrations, and also a section of full color plates.

Photosynthesis, sixth edition. D.O. Hall & K.K. Rao. Cambridge University Press, Studies in Biology Series, 40 West 20th Street, New York, New York 10011-4211, United States. 1999. xiv. 214 pp. \$54.95 (hardcover); \$19.95 (paper). ISBN 0-521-64257-4 (hardcover); 0-521-64497-6 (paper).

Revised and updated from the fifth edition, this remains a text oriented toward undergraduate students.

Photosynthesis, A Comprehensive Treatise. A.S. Raghavendra (ed.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1998. xviii. 376 pp. \$115.00 (hardcover). ISBN 0-521-57000-x.

This is a comprehensive, advanced-level treatment of photosynthesis. An international team of experts has produced a series of papers that closely examine various aspects of photosynthesis.

Phytochemistry of Plants Used in Traditional Medicine, Proceedings of the Phytochemical Society of Europe 37. K. Hostettmann, A. Marston, M. Maillard & M. Hamburger (eds.). Clarendon Press, Oxford Science Publications, 198 Madison Avenue, New York, New York 10016, United States. 1995. xiv. 408 pp. \$130.00 (hardcover). ISBN 0-19-857775-3.

Much of this book focuses on strategies for discovery of new biologically active plant metabolites. Other topics include search for non cavity-producing sweeteners and systematic implications of medicinally active molecules.

Plant Allometry, The Scaling of Form and Process. Karl J. Niklas. The University of Chicago Press, 5801 S. Ellis Ave., Chicago, Illinois 60637, United States. 1994. xvi. 412 pp. \$62.50 (hardcover); \$24.95 (paper). ISBN 0-226-58080-6 (hardcover); 0-226-58081-4 (paper).

Allometric methods are applied to the study of plant growth and evolution. Having been successfully used in animal studies, allometry is a relatively little-used method for study of plants. General overviews of allometric methods are provided along with numerous examples of allometric examinations of plants ranging from single-celled algae to large trees.

Plant Breeding Reviews, vol. 12. Prof. Jules Janick (ed.). John Wiley & Sons, Inc., 605 Third Avenue, New York, New York 10158-0012, United States. 1994. xii. 315 pp. \$110.00 (hardcover). ISBN 0-471-57344-2; ISSN 0730-2207.

This volume is dedicated to Robert W. Allard. Ten papers are contributed by 21 authors. Paper topics include use of *Bacillus* as an insecticide, genetic engineering for viral resistance, carbon isotope discrimination, adaptation for drought and cold hardiness, genetic improvement of trees, use of DNA markers in perennial fruits, heterosis, artichoke breeding, and cultivar selection.

Plant Functional Types, Their Relevance to Ecosystem Properties and Global Change, International Geosphere-Biosphere Programme Book Series 1. T.M. Smith, H.H. Shugart & F.I. Woodward (eds.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1997. xiv. 369 pp. \$80.00 (hardcover); \$44.95 (paper). ISBN 0-521-48231-3 (hardcover); 0-521-56643-6 (paper).

This book is intended to provide information to be used to predict plant responses to global climate change. Some of the topics include biodiversity, desertification, and non-equilibrium effects.

Plant Life Histories, Ecology, Phylogeny and Evolution. Jonathan Silvertown, Miguel Franco & John L. Harper (eds.). The Royal Society, available from Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1997. xviii. 313 pp. \$29.95 (paper). ISBN 0-521-57495-1.

Section one provides phylogenetic perspective on use of life history traits for inferring relationships. The second section focuses on reproductive traits, section three on seeds and section four on recruitment and growth. A final section examines interactions between plants and their competitors, pollinators and symbionts.

Plant Lipid Biosynthesis, Fundamentals and Agricultural Applications, Society for Experimental Biology Seminar Series 67. John L. Harwood (ed.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1998. xiv. 378 pp. \$105.00 (hardcover). ISBN 0-521-62074-0.

A series of papers presented at a Society for Experimental Biology meeting at the University of Kent in 1997, examine lipid biosynthesis. Particular emphasis is placed on the impact of plant lipids from an economic perspective. Economic topics treated range from general vegetable oil production to production of specialized oils.

Plant Responses to Elevated CO₂, Evidence From Natural Springs. A. Raschi, F. Miglietta, R. Tognetti & P.R. van Gardingen (eds.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1997. xiv. 272 pp. \$69.95 (hardcover). ISBN 0-521-58203-2.

Given recent measurements of rise in concentration levels, it is important to know how plants will respond to elevated carbon dioxide levels in the atmosphere. The premise of this book is that such effects can be effectively assessed by examining plant responses in springs with naturally high carbon dioxide levels. Such studies allow data collection in large systems exposed to high carbon dioxide levels for long periods of time, as opposed to relatively small, short-term experiments in environmental chambers.

Plant Variation and Evolution, third edition. D. Briggs & S.M. Walters. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1997. xxii. 512 pp. \$80.00 (hardcover); \$34.95 (paper). ISBN 0-521-45295-3 (hardcover); 0-521-45918-4 (paper).

This third edition is substantially rewritten from the previous two editions. Designed as a textbook to encourage inquiry by providing a context for the current state of knowledge, the book first lays an historical groundwork, then presents the current state of knowledge of plant variation based on a wide series of experimental techniques. The techniques treated include breeding systems, genecology, and hybridization. In addition, substantial coverage is given to concepts and processes of speciation, evolution, and conservation.

Plants and UV-B, Responses to Environmental Change, Society for Experimental Biology Seminar Series 64. Peter Lumsden (ed.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1997. xx. 355 pp. \$105.00 (hardcover). ISBN 0-521-57222-3.

The timeliness of this book is based on the predicted increase in incident UV-B radiation as a consequence of stratospheric ozone depletion. Introductory papers provide context and background for the later papers. Section two examines effects of UV-B at the cellular level while section three reviews effects at the whole plant and community levels.

Population Biology of Grasses. G.P. Cheplick (ed.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1998. xii. 399 pp. \$85.00 (hardcover). ISBN 0-521-57205-3.

Based on a symposium at the annual meeting in San Diego, California of the Botanical Society of America in 1995. Three major sections examine population variation and life history patterns, ecological interactions, and population biology of specific groups.

Pyrethrum Flowers, Production, Chemistry, Toxicology and Uses. John E. Casida & Gary B. Quistad (eds.). Oxford University Press, 200 Madison Avenue, New York, New York 10016, United States. 1995. xii. 424 pp. \$55.00 (hardcover). ISBN 0-19-508210-9.

Based on a symposium held in Hawaii in 1992, this book is a compilation of information on *Pyrethrum* and its insecticidal metabolites the pyrethrins. In addition to papers on current research and future trends, there are papers reviewing the historical context of the topic. Major sections of the book consider cultivation and crop improvement, pyrethrin chemistry, pyrethrin toxicology, and uses of *Pyrethrum* in pest control.

Rare Lilies of California. Peggy Lee Fielder. California Native Plant Society, 1722 J Street, Suite 17, Sacramento, California 95814, United States. 1996. xiv. 154 pp. \$100.00 (hardcover); \$24.95 (paper). ISBN 0-943469-31-x (hardcover); 0-943460-30-1 (paper).

The introductory chapter in this work provides descriptions of all the lily genera in California, both rare and common. This is followed by a discussion of the causes for lily rarity in California, and a presentation on lily evolution and ecology in California. The heart of the book is the descriptions and color plates of the rare lilies in California. This section includes 38 species. The descriptions include notes about distribution, habitat, natural history and factors affecting the plant's rarity.

Reaching for the Sun: How Plants Work. John King. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1997. viii. 232 pp. \$54.95 (hardcover); \$16.95 (paper). ISBN 0-521-55148-x (hardcover); 0-521-58738-7(paper).

Written to provide a lay audience with non-technical information to assist with understanding the functioning and importance of plants, this book presents concepts that people can relate to their lives. The first paragraph is illustrative of the approach. Here, the author describes the "feeling of relief on a hot, sunny day of walking barefoot from, say, a concrete driveway or a dry, sandy beach onto a lawn." The question is then asked and answered why the temperature change?

Seaweed Ecology and Physiology. Christopher S. Lobban & Paul J. Harrison. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1996. xii. 366 pp. \$69.95 (hardcover); \$29.95 (paper). ISBN 0-521-40334-0 (hardcover); 0-521-40897-0 (paper).

Based on a revision of *The Physiological Ecology of Seaweeds* published in 1994, this book is written as a textbook for covering this topic. Unlike many other textbooks on seaweeds in particular and algae in general, this one is much more ecologically oriented and less morphologically/anatomically oriented. While there is an introductory chapter on morphology, the later chapter topics relate to communities, competition, light, nutrients, temperature, salinity, currents, pollution, and mariculture.

Sichuan Zhibei. Sichuan Flora Committee (eds.). Sichuan Jenmin Press, Chengdu Institute of Biology, Academia Sinica, Chengdu, Sichuan, People's Republic of China. 1980. ii. 465 pp. + color plates. 6.5 yuan (paper). ISBN unknown.

This book contains beautiful illustrations of some of the scenery and rare plants of the Hengduan Mountain region. The captions are written in both Chinese and English. Most of the text is written in Chinese, English and Tibetan.

Soils, Land and Food, Managing the Land During the Twenty-First Century. Alan Wild. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 2003. x. 351 pp. \$75.00 (hardcover); \$26.00 (paper). ISBN 0-521-52759-7.

As populations grow, land use becomes a more and more critical issue. Larger populations require greater land areas for living spaces and greater land areas are required to produce the food for those populations. The book examines natural factors that influence productivity, reviews current and historical land use, summarizes factors that comprise significant variables for land use. The final four chapters of the book focus on specific land use practices from various parts of the world and an examination of prospects for land use in the future.

Tesis Sobre Temas Botánicos en la Biblioteca del Herbario Nacional, Cuadernos del Instituto de Biología 20. Armando Butando & Alfredo Wong. Secretaría Académica del Instituto de Biología, Universidad Nacional Autónoma de México, Apartado Postal 70-233, 04510 México, D.F., México. 1994. 152 pp. Price unknown. ISBN 968-36-3439-7.

This book comprises a cross index to the volumes housed in the Biblioteca del Herbario Nacional at UNAM. Titles are ordered by author in one list, and by taxonomic names and topics in the other. This book will be useful to anyone who wishes to consult the holdings in this library.

The Anther, Form, Function and Phylogeny. William G. D'Arcy & Richard C. Keating (eds.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1996. xii. 351 pp. \$80.00 (hardcover). ISBN 0-521-48063-9.

The basis of this volume is a series of papers that were presented at the 1993 International Botanical Congress held in Yokohama, Japan. In addition to the symposium papers, three additional papers have been included as well as a methodological summary and a bibliography. The focus of this book is the use of stamens as a source of data to infer phylogenetic relationships.

The Chemistry of Life, The McGraw-Hill Horizons of Science Series. Martin Olomucki, translated from the French by Isabel A. Leonard. McGraw-Hill, Inc., 1221 Avenue of the Americas, New York, New York 10020, United States. 1993. 132 pp. \$9.95 (paper). ISBN 0-07-047929-1 (paper).

Basic principles of biochemistry are presented in the context of functioning cells as well as pre-biotic chemical processes. Initial chapters describe the underlying chemical processes upon which life depends. Later chapters cover the more complex chemistry of molecular interactions in living cells and their macromolecules.

The Diatoms: Applications for the Environmental and Earth Sciences. Eugene F. Stoermer & John P. Smol (eds.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1999. xii. 469 pp. \$115.00 (softcover). ISBN 0-521-58281-4.

The primary focus of this book is the use of diatoms as sensors of change. In particular, the usefulness of diatoms for monitoring global climate change is reviewed. Other uses for diatoms reviewed include archaeology, oil and gas exploration, forensics and as diatomaceous earth.

The Ecology of Tropical Food Crops, second edition. M.J.T. Norman, C.J. Pearson & P.G.E. Searle. Cambridge University Press, 40 West 20th Street, New York,

New York 10011-4211, United States. 1995. x. 430 pp. \$69.95 (hardcover); \$29.95 (paper). ISBN 0-521-41062-2 (hardcover); 0-521-42264-7 (paper).

This book has four main sections. The initial section contains general information about tropical crops, climates and soils. The second section concentrates on grain crops and has individual chapters on rice, maize, sorghum and millet. Sections on legumes and non-cereal energy crops round out the book. The legume section has chapters on peanut, bean, soybean and chickpea. The non-cereal energy crops highlighted are cassava, sweet potato, yams and bananas.

The Enigma of Angiosperm Origins, Cambridge Paleobiology Series 1. Norman F. Hughes. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1994. xiv. 303 pp. \$59.95 (hardcover). ISBN 0-521-41145-9.

The current work is a sequel to *Paleobiology of Angiosperm Origins* which was published in 1976. The author is an avowed believer in the fundamental strength of the fossil record (as opposed to molecular or comparative anatomical means) as a tool for determining time of origin of the angiosperms. A range of paleobotanical data are reviewed and conclusions offered based on those data. Some future courses of research are also suggested.

The Farming Game Now. J.P. Makeham & L.R. Malcolm. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1993. xii. 399 pp. \$79.95 (hardcover); \$34.95 (paper). ISBN 0-521-40452-5 (hardcover); 0-521-42679-0 (paper).

An economics oriented view of farming, this book provides the reader with a wealth of information that can be useful to assess whether or not farming is likely to provide the economic returns that may be sought. While there is some emphasis on comparison of farming today with farming in the past, the primary purpose of the book is to help the reader understand the economics of the farming enterprise.

The Ferns of Britain and Ireland, second edition. C.N. Page. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1997. xx. 540 pp. \$125.00 (hardcover); \$64.95 (paper). ISBN 0-521-58380-2 (hardcover); 0-521-58658-5 (paper).

In addition to ferns, this book includes clubmosses, quillworts and horsetails. Designed as a field guide, this volume is much more comprehensive than the typical field guide. The descriptions are extensive, including sections entitled preliminary recognition and occurrence—both typical for field guides. In addition, more complete descriptions are found. These latter contain more lengthy information on identification, sections on variation, possible confusion, technical confirmation and field notes. In addition to these textual materials, distribution maps, phenological diagrams and drawings are also included.

The Freshwater Algal Flora of the British Isles, An Identification Guide to Freshwater and Terrestrial Algae. D.M. John, B.A. Whitton & A.J. Brook (eds.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 2002. xii. 702 pp. \$125.00 (hardcover). ISBN 0-521-77051-3.

This flora in standard book form is accompanied by a CD-ROM. The CD contains color images of more than 500 of the algal species treated. In all, the book covers more than 1700 species. Diatoms are excluded from the species treatment.

The Gene Civilization, The McGraw-Hill Horizons of Science Series. Francois Gros, translated from the French by Lee F. Scanlon. McGraw-Hill, Inc., 1221 Avenue of the Americas, New York, New York 10020, United States. 1992. 163 pp. Price unknown. ISBN 0-07-024963-6 (paper).

Molecular biology—its powerful potential and some of the issues it raises are reviewed in this book. Historical perspectives and descriptions of historical landmarks are included in the book. Some of the issues examined include genetic engineering of crops, cloning, genetics and health care, and socioeconomic differences in access to biotechnology.

The Identification of Flowering Plant Families, fourth edition. James Cullen. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1997. xii. 215 pp. \$59.95 (hardcover); \$21.95 (paper). ISBN 0-521-58485-x (hardcover); 0-521-58550-3 (paper).

This exceedingly useful book contains both keys to and descriptions of the families of flowering plants. The glossary and bibliography are also important parts of this book. Possibly the greatest value of this book is that all the information is contained in a condensed form that may be carried in a

pocket. This mobility makes for a book that will be very heavily used by field botanists.

The Message of Fossils, The McGraw-Hill Horizons of Science Series. Pascal Tassy, translated from the French by Nicholas Hartmann. McGraw-Hill, Inc., 1221 Avenue of the Americas, New York, New York 10020, United States. 1993. 163 pp. \$10.95 (paper). ISBN 0-07-062947-1 (paper).

This book provides a readable overview for the general public of fossils and the fossilization process. Concepts covered include the representativeness of the fossil record, extrapolation from fossil data, application of fossil data to evaluate hypotheses, and correlation of fossil data with other types of data.

The Molecule and Its Double, The McGraw-Hill Horizons of Science Series. Jean Jacques, translated from the French by Lee Scanlon. McGraw-Hill, Inc., 1221 Avenue of the Americas, New York, New York 10020, United States. 1993. 128 pp. \$10.95 (paper). ISBN 0-07-032399-2 (paper).

The concept of chirality is the subject of this book. Pasteur's observations of "dissymmetry" are the starting point for the book. Carbon chemistry is treated in the context of how it can produce chiral molecules and how the activity and usefulness of those molecules may produce major differences within living organisms.

The Names of Plants, third edition. David Gledhill. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 2002. x. 326 pp. \$70.00 (hardcover); \$25.00 (paper). ISBN 0-521-81863-x (hardcover); 0-521-52340-0 (paper).

This is an invaluable book for understanding plant names. Introductory information includes the basics of botanical nomenclature. The bulk of the book is the glossary that provides translations of Latin words used in botanical nomenclature and also provides information about the origin of many botanical names.

The New Gardner, The Practical Guide to Gardening Basics. Pippa Greenwood. Dorling Kindersley Publishing, 95 Madison Avenue, New York, New York 10016, United States. 1995. 176 pp. \$24.95 (hardcover). ISBN 1-56458-650-2.

A wealth of information is packed into the pages of this book. Information on the pages is organized in an easy to use pattern that will be welcomed by many gardeners. While the focus is on ornamentals, there is also information about growing vegetables.

The Pepper Lady's Pocket Pepper Primer. Jean Andrews. University of Texas Press, Box 7819, Austin, Texas 78713-7819, United States. 1998. viii. 184 pp. Price unknown (paper). ISBN 0-292-70483-6.

The various species and cultivars of peppers are included in this book. General information on growing, processing and identifying peppers is followed by descriptions of each of the pepper types. Each pepper is described and illustrated. The descriptions include not only morphological features, but also distribution, sources, uses and general notes.

The Physiology of Fungal Nutrition. D.H. Jennings. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1995. xvi. 622 pp. \$150.00 (hardcover). ISBN 0-521-35524-9.

This book focuses on the physiology of fungal nutrition—specifically on processes that occur at the plasma membrane. Transport mechanisms are critically important in this system, and both molecular level and bulk transport processes are examined. Additional chapters focus on transport of specific elements and molecules.

The Phytogeography of Northern Europe: British Isles, Fennoscandia, and Adjacent Areas. Eilif Dahl. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1998. xii. 297 pp. \$95.00 (hardcover). ISBN 0-521-38358-7.

Published posthumously, this book examines the geographic relationships of the northern European flora. After establishing the context of climate, edaphic factors and geological history of the flora, geographic affinities of the flora are reviewed. The main text concludes with chapters on endemism/disjunction and plants distributed by the activities of humans.

The Plant Book: A Portable Dictionary of the Vascular Plants, second edition. D.J. Mabberley. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1997. xvi. 858 pp. \$49.95 (hardcover). ISBN 0-521-41421-0.

This is a new expanded edition of an indispensable reference book. The book is comprehensive, yet compact enough to be used in the field.

The Rare Plants and Flowers of Western Sichuan. Ma Shitu (ed.). Sichuan Jenmin Press, Chengdu Institute of Biology, Academia Sinica, Chengdu, Sichuan, People's Republic of China. 1985. i. 107 pp. 17 yuan (paper). ISBN unknown.

This book contains beautiful illustrations of some of the scenery and rare plants of the Hengduan Mountain region. The captions are written in both Chinese and English. Most of the text is written in Chinese, English and Tibetan.

The Realm of Molecules, The McGraw-Hill Horizons of Science Series. Raymond Daudel, translated from the French by Nicholas Hartmann. McGraw-Hill, Inc., 1221 Avenue of the Americas, New York, New York 10020, United States. 1993. 132 pp. \$9.95 (paper). ISBN 0-07-015642-5 (paper).

While the title of this book implies a focus on molecular interactions and how those interactions are affected by the physical/chemical characteristics of the atoms involved, the true focus of the book is how these physical processes operate in living organisms. The core 50 pages of the book do concentrate on molecular interactions, but this treatment is bracketed by an initial chapter on cells, genetics and metabolism, and a final chapter that reviews some practical implications (such as antibiotics, tumors, and AIDS virus) of biochemistry. The conclusion touches on the subject of "controlling" molecules to meet the needs of humans.

The Shoot Apical Meristem, Its Growth & Development, Developmental and Cell Biology Series 34. Robert F. Lyndon. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1998. xvi. 277 pp. \$90.00 (hardcover). ISBN 0-521-40457-6.

Ten chapters comprise this book. From the initial chapter on the apical cell proper, to the final chapter on the floral meristem, Lyndon has presented a thorough treatment of shoot apical meristems.

The Vascular Plants of Iowa, an Annotated Checklist and Natural History. Lawrence J. Eilers & Dean M. Roosa. University of Iowa Press, 119 West Park Road, 100 Kuhl House, Iowa City, Iowa 52242-1000, United States. 1994. xiv.

304 pp. \$29.95 (hardcover); \$14.95 (paper). ISBN 0-87745-463-9 (hardcover); 0-87745-464-7 (paper).

Review of the physiographic and ecological features of Iowa begins this book. The bulk of the text consists of species summaries for the Iowa flora. Each summary includes current name, synonymy, common name, habitat, abundance and distribution, and origin.

Vascular Plants of Russia and Adjacent States (the former USSR). S.K. Czerepanov. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1995. x. 516 pp. \$100.00 (hardcover). ISBN 0-521-45006-3.

This is an updated, English language version of the *Vascular Plants of the USSR*, originally published in Russian in 1981. More than 22,000 species and subspecies are included.

Vegetation of Southern Africa. R.M. Cowling, D.M. Richardson & S.M. Pierce (eds.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211, United States. 1997. xxxiv. 615 pp. Price unknown (hardcover); ISBN 0-521-57142-1.

Physiography and history comprise the first part of this book. The bulk of the book is devoted to the biomes. Such exotic names as Fynbos, succulent karoo and Nama-karoo accompany the more commonly encountered desert, grassland, savanna and forest. Coastal vegetation, freshwater wetlands and marine vegetation each have their own chapter. The book concludes with a series of chapters on ecological themes—those factors that influence the vegetation.

Woody Flora of Ganzizhou in Sichuan. He Jiaren. Sichuan Jenmin Press, Chengdu Institute of Biology, Academia Sinica, Chengdu, Sichuan, People's Republic of China. 1993. 1160 pp. 50 yuan (hardcover). ISBN 7-5364-2733-6.

The woody flora of this floristically rich area is summarized in this volume. The text is Chinese, but the Latin names are readable and drawings and maps are useful even for those of us who do not read Chinese.

CORRECTIONS AND ADDITIONS

Volume 80, issue 1, pages 45-46, the caption for Table 2 that appears on the bottom of page 45 should have appeared at the top of page 46 with the Table.

Volume 81, issue 1, front cover, contents, second author for paper beginning on page 28 is B.R. MacRoberts, not B.H. MacRoberts.

Volume 81, issue 1, front cover, contents, publication is spelled incorrectly in the next to last line.

Volume 81, issue 2, page 88, correct *Quercus chrysolepis* for *Quercus chysolepis*.

Volume 81, issue 2, page 124, correct anatomía for anatom'a.

Volume 82, issue 1, page 50, line 4, symbol substituted for quotation mark, phrase should read "M. dilacerata" complex.

Volume 84(3) headers for even numbered pages 172-294 should read March 1998 instead of March 1999.

NEW NAMES IN THIS ISSUE OF PHYTOLOGIA

As a result of the International Botanical Congress in Tokyo in 1993, the International Association of Plant Taxonomy has been tasked with exploring the feasibility of registration of plant and fungi names. In accordance with terms of the pilot implementation of the registration concept, new names and combinations produced in this issue of PHYTOLOGIA are listed below.

New name or combination	Page Number
<i>Phlox nivalis</i> Lodd. var. <i>texensis</i> (Lundell) B.L. Turner	324
<i>Cymopteris filifolius</i> (Mathias, Constance & Theobald) B.L. Turner	331
<i>Cymopteris hallii</i> (A. Gray) B.L. Turner	334
<i>Cymopteris longiradiatus</i> (Mathias, Constance & Theobald) B.L. Turner	335
<i>Verbesina tamaunuevana</i> B.L. Turner	336

TRANSFER OF MANAGEMENT OF PHYTOLOGIA

After more than fourteen years and twenty volumes, the time has come to transfer the management of PHYTOLOGIA to someone else. With the conclusion of volume 85, management of PHYTOLOGIA will be taken up by Justin Williams. The contact information for subscribers, authors and others will be:

Dr. Justin Williams
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Records for all current subscribers have been transferred to Dr. Williams and credit will be given to those subscribers who have paid in advance for volumes yet to be published. All manuscripts in hand at the time of the exchange have also been transferred to Dr. Williams, and page charges already paid have been transferred. Dr. Williams will begin management of PHYTOLOGIA with volume 86.

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Information for Authors

Articles from botanical systematics and ecology, including biographical sketches, critical reviews, and summaries of literature will be considered for publication in *PHYTOLOGIA*. Manuscripts may be submitted either on computer diskette, or as clean typescript. Diskettes will be returned to authors after action has been taken on the manuscript. Diskettes may be 5.25" or 3.5" and may be written in any IBM or MacIntosh compatible format. Typescript manuscripts should be single spaced and will be read into the computer using a scanner. The scanner will read standard type fonts but will not read dot matrix print. Manuscripts submitted in dot matrix print cannot be accepted. Use underscore (not italics) for scientific names. Language of manuscripts may be either English or Spanish. Figures will be reduced to fit within limits of text pages. Therefore, figures should be submitted with internal scales. Legends for figures should be included in figures whenever possible. Each manuscript should have an abstract and key word list. Specimen citations should be consistent throughout the manuscript. Serial titles should be cited with standard abbreviations. References cited only as part of nomenclatural summaries should not appear in Literature Cited. Nomenclatural work should include one paragraph per basionym and must provide proper (as defined by the current *International Code of Botanical Nomenclature*) citation of sources of epithets and combinations.

Authors should arrange for two workers in the appropriate field to review the manuscript before submission. Copies of reviews should be forwarded to the editor with the manuscript. Manuscripts will not be published without review.

Cost of publication is currently \$13.00 US per page for publication without reprints. Publication with 100 reprints is provided for \$18.00 US per page, 200 reprints for \$21.50 US per page. Page charges are due with manuscript and no paper will be published before payment is received in full. Reprints must be ordered and paid for in advance. Page charges will be determined on the basis of a typeset page. Title page should include title, author(s) name(s), and address(es). No extra charge is made for line drawings provided they conform to limitations of size and proportion for normal text. Halftones require an extra charge of \$14.00 US per page at 100%. Enlargements or reductions cost an additional \$6.00 per page.

With the completion of volume 85, *Phytologia* management will transfer and this information may change. Please look for additional information in this issue.